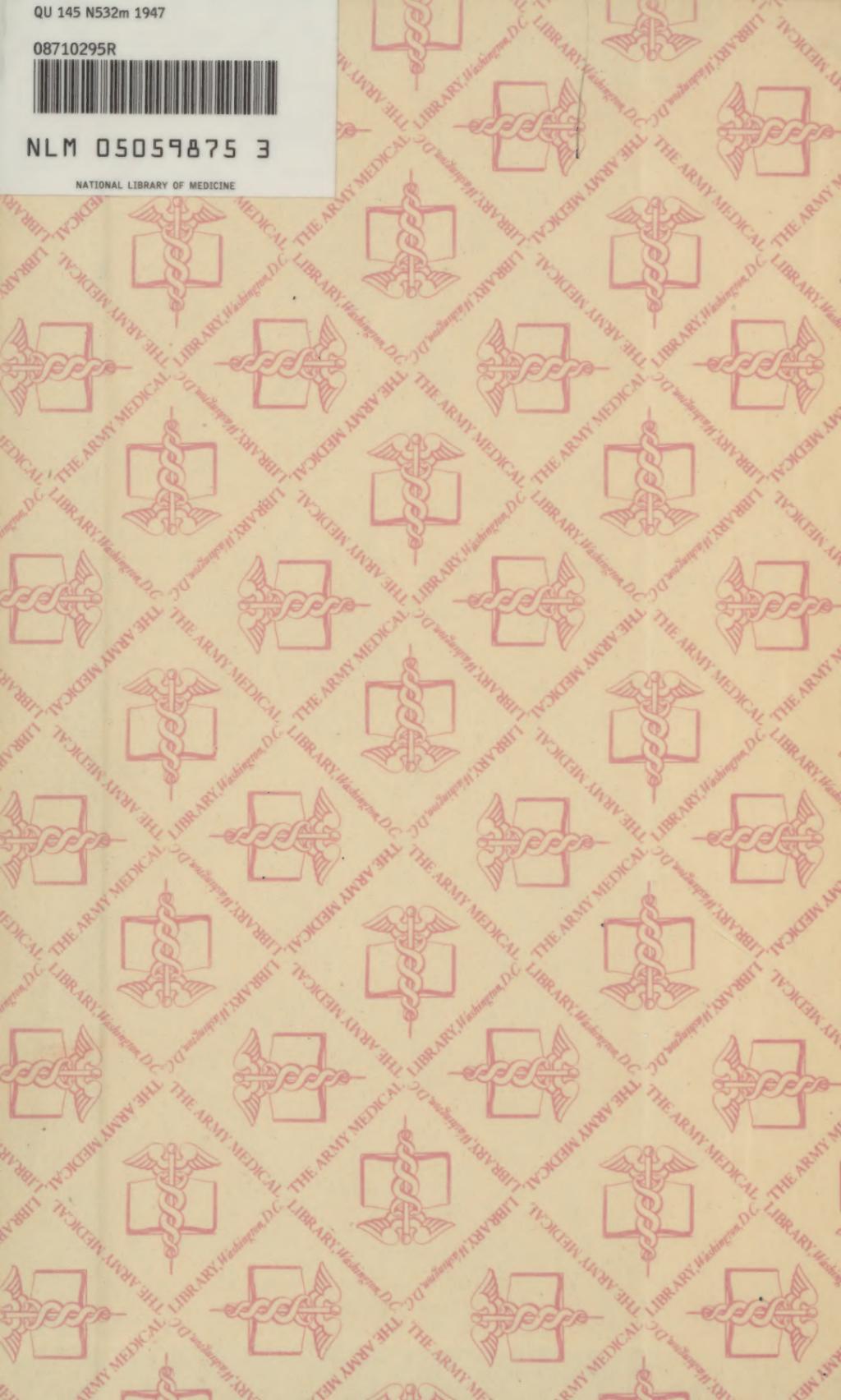


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FEB 10 1948

Final Report
of the

LS60

New York State Joint Legislative Committee on Nutrition

New York (State) legislature. Joint
Committee on Nutrition

**NEW YORK STATE JOINT LEGISLATIVE COMMITTEE
ON NUTRITION**

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Introduction

By Senator Thomas C. Desmond

Chairman, New York State Joint Legislative Committee on Nutrition

TO DAY you are entering a new food era. Fission of the atom will undoubtedly produce new elements of far-reaching importance to your diet. Already, scientists are exploring means of using the intense radiation produced by fission to destroy bacteria in foods and to preserve foods for long periods. Radioactive tracers hold out substantial hope of giving us new understanding of our food needs. The "hunger fighters" in their laboratories are opening up new facets of information and understanding, which cannot help

but have an enormous impact on what we put on our plates in the future.

And though we leap ahead to new findings in our laboratories, we inch slowly ahead in the field of public policy as it relates to nutrition. We all know that food is one of man's essentials; he cannot live without it; he cannot enjoy life without it. Yet today public officials seem more concerned with party lines than waist lines.

Key public officials pressed by a host of urgent, vexing problems, treat nutrition as a minor irritant



Wheat—Key to World Peace.

—USDA photo by McManigal

like a mosquito that buzzes around one's head and must be slapped down. In reality, the science of nutrition presents a great challenge and opportunity to public officials to build a greater, stronger America. Bluntly, too many policy makers are concerned with the nutrition problem only when they sit down to eat. If our public officials were but to translate into social policy the existing knowledge of our nutritional scientists, we could build now more robust Americans, and probably add ten years of vigor to their lives.

In a world plagued by suspicions, rivalries and misunderstandings, those who are concerned with America's defense might do well to consider not only our capacity to produce more rocket planes and more atom bombs, but also our capacity to produce more vigorous men and women, mentally alert and physically strong to defend us. Let us admit it frankly, the United States Army in World War II could have added greatly to its striking power if it had not had to weed out millions of sickly boys and men; and unknown thousands who were accepted by the Army had to be restricted to "limited duty" because of defects attributable in large measure to long years of having eaten not enough of the right foods.

This is the fifth and final report of our Committee. With this report, our Committee concludes its efforts to chart a broad nutritional policy for our people. We seek nothing radical, nothing that cannot be reasonably achieved in our time.

Our Committee seeks, in effect, a "Basic 7" program:

1. Full support of a strong international nutrition agency.
2. A vigorous permanent educational program instead of sporadic nutrition campaigns, so that each new generation will be taught the facts about food and health.
3. An enlarged fortification program to cover cheap, basic foods.
4. A permanent industrial feeding program.
5. A permanent school lunch program to cover all children who need a nourishing noon meal.
6. A vast maternal and infant nutrition program to help assure birth and growth of husky youngsters.



—Photo by Chechik
Mom sure packs a lunch with a punch.

7. A special educational program directed at the aged.

In the chapters that follow, various authorities present elaborations or detailed analysis of this fundamental program. The nutrition experts consulted by our Committee are virtually unanimous in agreement with our basic nutrition plan. It is now up to the policy-makers to heed the cry of America's people: "Teach us what we need to know about our diets. Strengthen our food that it may give its strength to ourselves and our children".

America desperately needs leadership in the field of nutrition. We have permitted our industrial feeding program to shrivel up; we have allowed the educational campaign for better nutrition to stop; we have permitted a halt to the expansion

of the fortification program; we have allowed comparatively small amounts of money to stand in the way of pioneering research.

Our Committee, as it completes its own task, is hopeful that the American people will demand not curtailment but expansion of the nutrition program, so that our country may build a stronger, healthier America. Our Committee is proud of having worked for the establishment of a school lunch program in our state, for fortification of bread in our state, for wider use of micro-chemical assays and a host of other advances. But above all, we are grateful for the opportunity afforded to assist the nutrition experts, who regardless of obstacles, have striven to lift our people to new levels of health through better diets.

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Message to the Governor and the Legislature of the State of New York

NATIONS may solemnly pledge themselves to outlaw war, but so long as men lack food, war will plague mankind. Treaties are no substitute for sustenance. And, unfortunately, the gnawing pangs of hunger stab at the stomachs of millions of human beings in our world. In India, China, Greece, Poland, and other parts of a war ravaged world, men, women and children die for want of food. And millions of others, who can eat well enough to stave off stark hunger, drag themselves through life weighted down by the burden of "hidden hunger."

Man, who has learned to erect huge skyscrapers, propel huge machines on land, on the sea and in the air, and now is learning how to harness nuclear energy, has failed virtually throughout his existence to provide adequate food for the peoples of the earth.

And yet, scientists assure us that we have the knowledge and ability to provide the 2,000,000,000 people on earth with enough food for health and vigor.

Why this lag between our knowledge and our performance? Simply this: We have not been able to break through the narrow nationalism, the lack of education, and the backwardness of many nations. But today we must awaken to the fact that there is less world security in international compacts than

there is in full stomachs for all mankind. We can strike not merely at the symptoms of war but at a root cause of war by applying science and technology to soil and food with the same intentness and vigor we have applied to turning out automobiles, refrigerators, and vacuum cleaners.

World War II robbed our State of many of our finest youths; and gave us back many men with their limbs torn off, their eyesight destroyed, their nervous systems permanently jarred. The white stars that hung in windows told a story of sacrifice and suffering. Our State and each of our communities, therefore, has a vital stake in wiping out the hunger that leads men to war.

Therefore, our Committee urges that the full support of our people be placed behind the Food and Agriculture Organization of the United Nations. This agency is founded on the simple proposition that there can be food for all. Its 47 member nations are committed to raise the levels of nutrition of the people within their own territories and to cooperate with each other in assuring adequate food to the people of all countries. Among the many difficult problems besetting our world, let us keep our eye on World Problem No. 1: Food.

Food for all means peace for all. We offer this as a slogan that needs to be embedded in the consciousness of all people.

U. S. Food Outlook

1947 will be a year of hunger for millions throughout the world, but we in the United States will find our cupboards stocked with foods. We shall have more to eat in 1947 than we did before World War II.

In a prior report this year, "Food Prospects for 1947," we presented a forecast by experts as to our prospective food production and consumption. Expected are larger supplies of meat, cheese, fresh fruits and vegetables, and baby foods, and possibly a smaller amount of milk. Fats and sugar are expected to remain in short supply. Most heartening is an expected 15 per cent drop in food prices.

In view of this tremendous output and the needs of human beings abroad, it is no more than right that we should ship grains and other foods abroad to prevent mass starvation.

How Good Are Our Diets?

In our 1946 report we stated that the facts available on the American diet are almost as inadequate as the diets themselves. During the past year little additional information has been added to our knowledge on this problem. The most comprehensive study was made 10 years ago and covered not the nutritional status of our people but an analysis of food consumed.



The average family wastes enormous amount of nutrients each day.

—USDA photo by Knell

Nonetheless the various past surveys of food consumed indicate that only about one out of four American families eats a diet that can be rated "good."

A gigantic potential market lies awaiting for our farmers. If all our citizens ate a decent diet, our farmers would have to provide 38 billion more quarts of milk, 125 million more pounds of leafy green and yellow vegetables, 400 million more pounds of meat, poultry and fish, and 135 million more dozens of eggs. A nation-wide drive that lifts the nutritional standards of our people would improve our national vigor and give our farmers long range security.

Our National Nutrition Crisis

The Federal Government, despite the urgent need for a strong nutrition program, has virtually folded up its nutritional education program. It has "watered down" its nutrition-in-industry program so that it cannot provide field assistance to states and factories. The Federal Government's fortification program, begun so brilliantly with the bread enrichment regulation, has been permitted to bog down. It has permitted the school lunch program to be hampered by crisis piled upon crisis.

We believe the post-war period needs a strong, sweeping nationwide nutrition program. This is no time to retreat; this is a time to spearhead a new drive to bring to our people the advances our scientists can make available to them.

Our Committee recommends that the President of the United States call a National Nutrition Conference, along the lines of the great nutrition conference called in 1941 to chart war-time nutritional needs. We recommend that this National Nutrition Conference of 1947 be assigned the task of charting a 10-year nutrition program, to include:

1. A permanent Federal nutrition agency to coordinate the various agencies working in this field and to provide continuing leadership.
2. A maternal nutrition program that will couple education of prospective mothers in sound diet habits with perhaps inexpensive vitamin and mineral supplements.
3. Pushing back the frontiers of nutrition by intensifying research and by soil fortification, food enrichment, and seed improvement programs.
4. Organization of a special nutrition for those over 40.
5. Channeling nutritious foods to low-income families.
6. A wide-scale nutrition and industry program emphasizing factory canteens, between-meal snacks; nutritional education.
7. A permanent school lunch program that will not produce semester - by - semester crises for local schools, which at present know not from one semester to another whether funds will be available to continue their cafeterias and low-cost meals.

8. An expansion of the Federal "enrichment" policy to cover not only bread, but also salt, margarine, evaporated milk, macaroni and other commonly used foods.

State Nutrition Program

Despite the numerous State agencies whose activities deal with or impinge on nutrition, there is no official State nutrition program.

During World War II there was an attempt to provide a central leadership and coordination of the State's many nutritional activities. With war's end, such official efforts were abandoned.

Fortunately, an unofficial organization of public and private nutritionists, The New York State Nutrition Committee, has been trying to carry on virtually without funds a state-wide program, encouraging local nutritional committees, informally and unofficially working out ways of coordinating the work of various State nutritionists.

There are few functions of government more important than assuring that citizens have available adequate diets. Yet nutrition today is unfortunately relegated to a minor role in State affairs. Our top public policy-makers must begin to realize that the science of nutrition properly applied can pave the way to longer life, better health and improved morale.

It is imperative that our State realize the value of setting up a central coordinating agency in the field of nutrition.

Our Committee believes:

1. The State should set up a Nutrition Council in the Executive Department. The council should consist of the State Health Commissioner ex-officio, a representative of the School of Nutrition or School of Home Economics at Cornell University, and an outstanding non-state nutritionist appointed by the Governor.

The Council should be the policy-making agency in the field of nutrition. It should be appointed by the Governor and be close to him in order that it may have the prestige and influence necessary to coordinate the activities of the various departments. At present, nutritionists have no open door to the top policy-makers. Their ideas must churn their way through the maze of departmental channels before reaching top authorities. Creation of a council will step up the flow of ideas and programs.

2. The State Nutrition Committee should be granted official recognition by State law as the official advisory body of the proposed Nutrition Council. The State Nutrition Committee, as we have pointed out in previous reports, has the "know-how;" it should be given an opportunity to put its broad experience and scientific knowledge to maximum use.

3. The proposed Nutrition Council should be granted an ample appropriation to (a) encourage nutrition research; (b) allocate funds to existing State agencies for carrying out specific nutritional programs; and (c) launch a wide-scale nutrition education cam-

paign. It should be empowered to allocate its funds to other State agencies for the attainment of specific objectives.

4. The State should recognize the specific needs of such vulnerable groups as pregnant and nursing women, infants, pre-school and school children, adolescents, workers, and families having low incomes.

5. The State should undertake a special program to bring the latest nutritional data to the attention of the aged. Science believes the lives of the elderly can be lengthened and that they can have more years of vigor and strength by following a sound diet. Research on nutrition of the aged is urgently needed. An educational campaign would greatly benefit our old folks.

6. The State should train nutritionists in the recently evolved methods of mass assay and conduct such assays of the nutritional status of our people from time to time, so that the State will know at all times what the nutritional status of all segments of its people is.

7. The State should encourage fortification nationally of such commonly used foods as salt, bread, oleomargarine, etc., and when the Federal Government cannot do so, the State should require the enrichment of these products.

8. The State should, during the next five years, concentrate a large part of its nutritional attention on improving the diets of expectant mothers and improving the diets of low-income groups.

9. The State should not be content with coming to the rescue of the school lunch program when

Federal funds run out. The State should appropriate funds for a permanent State school lunch program which will enable all children to have access to a well-balanced, mid-day meal.

10. Nutritional standards in State institutions should be improved. The State Mental Hygiene Department has already taken steps to strengthen its nutritional set-up, but the State Department of Correction lags behind. Recent riots at Sing Sing due to improper cooking are merely symptoms of weakness in the preparation of food in the department. Appointment of a single nutritionist as adviser to the Correction Commission would save the State money in food purchases, and decrease wastage of food. Food inspectors of the Bureau of Food Control in the State Department of Agriculture and Markets should be authorized to make periodic inspections of State institutions.

11. Full and continued support should be given to the 10-year Newburgh-Kingston fluoride experiment which holds forth the hope that through the fortification of drinking water, dental decay may be cut markedly.

In other parts of this letter of transmittal, our Committee elaborates on several of the recommendations which are part of the above blue-print.

Nutrition of Expectant Mothers

Noted research scientists have shown our Committee that nutrition can reduce the hazards of

pregnancy and childbirth. On the basis of existing knowledge, it is estimated that nearly one million babies are born without their legacies of top-notch health because their mothers failed to receive adequate, nutritious balanced diets.

We have in our 1946 report, "Nutrition for Young and Old" presented findings of two renowned experts, Dr. H. C. Stuart, and Mrs. B. S. Burke, of the School of Public Health of Harvard University. On the basis of the findings of these scientists, our Committee recommends:

1. Health education should be offered to girls in high school and to young women in college and industry. This information program should include not only normal nutrition, but the special nutritional requirements imposed by pregnancy and lactation and their relationship to the well-being of infants as well as of mothers. This instruction would be most effective if offered to young women contemplating marriage, or recently married, and should be arranged for such groups.

2. Special nutrition services should be instituted in connection with prenatal clinics or other organized facilities for maternal care. In prenatal clinics, the simplest means of educating the pregnant woman in the importance of nutrition both to herself and to her unborn infant, and of offering practical advice on diet during pregnancy, is to include suitable trained nutritionists among the personnel of all prenatal clinics.

These nutritionists should cooperate with the clinic obstetricians to enable pregnant women to include the foods necessary to meet their requirements. The practical dietary advice and education offered by the nutritionist should be coordinated with the prenatal medical supervision so that the suggestions offered are adjusted to meet each woman's individual problems.

3. In private practice, the obstetrician or general practitioner is responsible for the proper management of the dietary problems of the pregnant woman under his care. The physician can render this service as part of routine prenatal visits provided his medical education included sufficient theoretical and practical education in nutrition. When special dietary problems arise which are time-consuming, the physician should be able to call upon the services of a suitably trained nutritionist on a consultation basis.

4. The nutritional advice offered as a part of routine prenatal care should include instruction in the dietary needs of the nursing mother. Further instruction should be given by the obstetrician and others concerned with the care of the mother and infant during the after-birth period. This service would extend throughout the period of lactation and should be continued as part of pediatric care.

5. Nutritional advice should also be available during the inter-pregnancy period in all cases where corrective nutrition is needed. This should be a routine part of after-birth care. In general, women who

have experienced difficulties during their first pregnancies are keenly interested in preparing for more satisfactory subsequent pregnancies.

6. In order to make the services outlined above possible and effective, the amount of nutrition education, both theoretical and practical, should be increased for medical and nursing students. There must also be more adequate training for nutritionists interested in this field. The more general educational part of this program necessitates additional nutritional training for school teachers and health educators.

It was 1922 when the State Health Department first appointed a nutritionist. And for 14 years that nutritionist struggled on alone, until 1936, when two additional nutritionists were appointed. Today the Division of Maternal and Child Health has five nutritionists. More are needed if the women and children of the State are to be adequately protected. The State Health Department is now considering a reorganization of its nutrition work. Our Committee hopes it will expand its maternal nutrition activities.

An improved maternal nutrition program will save the lives of infants who otherwise might be born dead, and will help produce stronger, healthier children.

Nutrition of the Aged

Scientists are confident that if the elderly ate a sound diet, based on latest scientific knowledge, they

could add many years of vigor to their lives.

Dr. C. Ward Crampton, former Chairman of the Committee on Preventive Medicine of the New York County Medical Society, has informed our Committee that the foremost nutritional defects in the mature and aging are calcium, iron and protein, and that 75 per cent of the men over 60 suffer a lack of one or more. And he charted for our Committee a suggested diet plan for men over 60 compared with a standard diet plan for a man of 30.

At Cornell University, brilliant researcher Dr. Clive M. McCay has, employing rats and dogs, uncovered many new facts which may have important bearing upon extension of the life span. At other universities a few pioneers are probing at the means of improving the health of the aged. Dr. Crampton puts it this way: "Whether a man is old or young at 60 depends much upon the diet."

Our Committee believes:

1. The State should undertake a program of nutrition of the aged, embracing research grants and an educational campaign. The old folks should be informed as to what foods they need, and scientists, who often find that for want of a few thousand dollars basic research is held up, should be granted financial aid.

Nutrition of Workers

In previous reports we have detailed the various surveys made of

workers' diets, indicating quite clearly that even when income is high, large proportions of our industrial employees fail to eat enough green or yellow vegetables, citrus fruits, and milk.

Industry, due to its own experiences and the educational work of the Federal and State governments, is now generally convinced of the dollar-and-cents value of factory canteens which serve low-cost, balanced meals to their employees. Yet much work remains to be done to convince smaller firms of the economic value of canteens.

The next major goal in industrial nutrition must be to demonstrate to businessmen the value of between-meal feeding. We have previously noted of the New Jersey concern which provides 1,500 employees with a free pint of milk during a five-minute recess and finds that production has gone up, accidents have slumped, and absenteeism has taken a sharp drop.

Since the Federal Government has shrunk its industrial feeding program to industry until it is just a shell of its former self, we believe the State Labor Department should be granted the employees necessary for maintaining a permanent industrial feeding program to provide technical advice to companies and to set up a large-scale educational program directed at workers.

School Lunch

In our 1946 report, we reported, "The school lunch situation in this country is in a mess, and has been

in a mess since it was first started during the depression years."

During the past year, some progress has been made. The Federal Government adopted a permanent school law providing for Federal aid on a matching basis with states and localities. However, so many states which hitherto had been reluctant to set up a school lunch program applied for financial assistance, that the \$75,000,000 appropriated by Congress was not enough to meet the demand.

New York State, expecting to receive about \$1,000,000 more than was actually obtained from the Federal Government, ran out of Federal school lunch money in February. Our Committee pledged its support to obtain an emergency appropriation, and in his annual message to the Legislature, Governor Thomas E. Dewey recommended State aid to help schools maintain their lunch programs.

Most heartening was the recognition by the Governor of the value of the school lunch program, for which our Committee has fought since it was first established. Governor Dewey, in his 1947 annual message, stated: "This program . . . has proved its value in the improved nutrition of children and the development of sound dietary habits among young people. . . . The children of this state should not be deprived of this essential and worthy program."

Thus one of the primary aims of this Committee, namely, to secure

official recognition of the merit of the school lunch program and to secure State aid for the program, has been attained.

But much more needs to be done.

We need a permanent school lunch law. We need an annual State aid appropriation for a school lunch program. We need closer supervision of school lunch programs, and better school lunches.

Dr. L. A. Maynard, Dean of the School of Nutrition, at Cornell University, and one of the Nation's foremost nutritionists, has said: "I believe that no state activity would accomplish as much in terms of better health as a statewide, adequately supported school lunch program.

In addition, the lunch program opens up to New York State farmers a huge market for disposal of surplus crops.

Our Committee believes:

1. Nutrition Problem No. 1 in New York State is the establishment of a permanent school lunch program with adequate State aid to assure that all pupils in the State have access to a nutritious mid-day meal.

Our Committee is glad to report that during its existence it has been able to have the Legislature pass and the Governor sign bills to allow local schools to subsidize their cafeterias and to provide an appropriation to employ school lunch supervisors. In the latter law (Ch. 632, 1946) there is a statement of fact which sums up the school lunch situation. It states:



Gov. Dewey signs the Desmond School Lunch bill.

"It has been conclusively demonstrated by authoritative surveys and investigations that widespread malnourishment exists among the children of this state. This 'hidden hunger' existing in childhood has been a major contributing factor to the development of many ailments in adult life, and has resulted in large numbers of our youth being rejected as unfit for service in the military forces of our country. School lunches have served not only to make nutritionally efficient food available to the children of this state, but also to help farmers dispose of agricultural surpluses, and to aid farmers in the long term development of better domestic markets for agricultural commodities."

Fortification of Foods

One of the great hopes for improving the diets of our people on

a mass basis lies in fortification of cheap, staple foods with health-giving nutrients.

War Food Order No. 1, requiring enrichment of bread, was a milestone in modern applied nutrition. Unfortunately, it was a war-time, impermanent measure. Thus in 1945, in accordance with a recommendation by our Committee, New York State adopted a permanent requirement (chapter 503, Laws of 1945) for enrichment of all white bread and rolls.

This enrichment policy should be extended by Federal law whenever possible, and by State law when Federal regulation is impractical, to cover not only bread, but also such foods as macaroni, salt, evaporated milk, margarine and other such products which are used by the masses of our people. Our bread enrichment law needs to be re-examined to determine whether or not its standards should be raised to use of dried skimmed milk, soya flour and dried brewers' yeast.

Our Committee recently requested the State Department of Agriculture and Markets to test samples of iodized salt to determine whether iodine content claimed on the label actually was in the salt at time of purchase.

Four samples were tested, with the following results:

Simple goiter, a common glandular ailment that according to some authorities strikes 5,000,000 Americans, can be easily, quickly and cheaply prevented by requiring the iodization of table salt.

In an article, "America Can Prevent Goiter," published in November, 1946, by *Ladies' Home Journal*, our Committee Chairman stated that the tragic resurgence of goiter is a disgraceful monument to our national neglect. He pointed out that the thyroid gland needs iodine to function properly, that addition of iodine to table salt would provide our people with the protection needed to protect millions of Americans now and for generations to come from falling prey to goiter. He called for Federal action to crush goiter permanently. Following publication of this article, at the annual conference of the State and Territorial Health Officers with the Surgeon General of the United States Public Health Service, Federal legislation to compel salt iodization was requested.

The American Public Health Association, leader in the move to fortify our salt with iodine, is having a bill introduced in Congress to provide for iodization of salt. The American Medical Association, the National Research Council, and other health groups are joining this campaign.

Unless we protect our families

Samples	Advertised as Having	Actual Contents
1.....	0.012% iodine as potassium iodide.....	0.012%
2.....	0.011% iodine as potassium iodide.....	0.01%
3.....	0.014% iodine as potassium iodide.....	0.01%
4.....	0.010% iodine as potassium iodide.....	0.006%

by using iodized salt, no one of us can safely say, "Goiter will not strike in my home."

Our Committee recommends:

1. The Federal Government promptly adopt legislation requiring fortification of table salt with 0.01% of potassium iodide or its equivalent.

2. Although New York State is not as badly afflicted with goiter as many other states, nevertheless we should not be complacent. We do have many goiter cases. And we do know that a small amount of iodine is an effective way of keeping the thyroid gland in good working condition and maintaining physical well-being.

Nutritional Assays

Our Committee during the past year granted funds to The Public Health Research Institute of New York City, where Dr. Otto A. Bessey had developed a microchemical nutritional assay test that opens the door to mass nutritional surveys.

At our request, Dr. Bessey and a specially hired team of researchers examined over 1,000 children in various parts of New York State. The results of this assay are outlined in another part of this report.

We hope that this assay by Dr. Bessey will serve three purposes: first, to show us in detail the nutritional status of a representative group of our school children, second, to provide added experience in the conduct of mass microchem-

ical assays so that perhaps eventually each local community can conduct a community-wide nutrition assay, and third, to provide encouragement to state administrative agencies to employ this new technique to appraise nutritional status of various groups of our people.

Local Nutrition Service

Previous reports of our Committee have indicated that our municipalities are doing little, with few exceptions, to promote the nutritional welfare of their people. Most of the local nutritional services are being rendered today by private, voluntary agencies. Nutrition is too important to be handled on an unofficial, part-time basis. Our municipalities should support an official nutrition program, at least by employing a full-time nutritionist or home economist who could act as executive secretary of the local nutrition committee.

Correction Department

Despite the million dollar budget of the Correction Department for food alone, there is not a single nutritionist or dietitian in the entire department.

Our committee believes that the Department of Correction could save a substantial sum of money, eliminate food waste, improve the nutrient content of food served, and use foods as an instrument of rehabilitation of criminals suffering from malnourishment if it em-



Chow-time: time to fill up with the right foods.

ployed a nutritionist as adviser in the State Commission of Correction.

Hearings

The Committee's work has embraced five public hearings, which attracted wide attention and obtained for the Committee a large quantity of valuable and important information.

Among those heard at the various hearings were: Mrs. Franklin

D. Roosevelt; Mayor F. H. LaGuardia of New York City; Dr. L. A. Maynard, Dean, School of Nutrition, Cornell University; Dr. Frank G. Boudreau, Chairman, Food and Nutrition Board, National Research Council; Professor Emeritus Samuel C. Prescott, of the Massachusetts Institute of Technology; Dr. Robert S. Harris, Director, Nutritional Biochemistry Laboratories, Massachusetts Institute of Technology; Dr. Margaret Mead, formerly Executive Seere-

tary, Committee on Food Habits, National Research Council; Dr. N. E. Dodd, Chief of the Agricultural Adjustment Agency; Dr. Roy F. Hendrickson, former Director of Food Distribution, War Food Administration; Professor F. A. Harper, Department of Agricultural Economics, Cornell University; Mr. Stanley P. Davies, General Director, Community Service Society of New York; Mr. Clarence Birdseye, President, Birdseye Food Corporation; Dr. Elmer Alpert, Nutrition Clinic, New York City Department of Health; Dr. James R. Wilson, Secretary, Council on Foods and Nutrition, American Medical Association; Dr. Callie Mee Coons, Assistant Chief, U. S. Bureau of Human Nutrition and Home Economics; Dr. C. Ward Crampton, former Chairman, Committee on Preventive Medicine, New York County Medical Society; Dr. Ralph R. Scobey, Associate Professor, Clinical Pediatrics, Syracuse Medical College; Mr. Daniel P. Wooley, OPA Regional Administrator; Dr. William C. Ockey, Associate Director, Food Distribution Programs Branch, Production and Marketing Administration; Dr. E. R. VanKleeck, State Deputy Commissioner of Education; Mr. Harvey K. Allen, Director, New York City Bureau of School Lunches; Miss May C. McDonald, Chairman, New York State Nutrition Committee; Dr. Edward Schlesinger, Director New York State Division of Maternity, Infancy and Child Hygiene; Dr. Bertlyn Bosley, Associate in Nutrition, Teachers College, Columbia University; Dr. David B. Ast,

Chief, Dental Bureau, State Department of Health; Dr. Reginald M. Atwater, Executive Secretary, American Public Health Association; Dr. Lionel B. Pett, Chief, Division of Nutrition, Department of National Health and Welfare, Canada; Mrs. Francis F. Gannon, Director, Division of Consumers Service, New York City; Mrs. Alexander Dushkin, Vice-Chairman, New York City Food and Nutrition Committee; Mr. Ole Salthe, Executive Secretary, Nutrition Foundation, Inc.; Mr. Chester A. Halnan, New York Area Officer for Marketing, Production and Marketing Administration; Mr. Charles E. Kellogg, Chief, Division of Soil Survey, U. S. Department of Agriculture; Mr. Paul S. Willis, President, Grocery Manufacturers of America, Inc.; Mr. H. H. Rathbun, President, Dairymen's League, Cooperative Association; Miss Sarah Gibson Blanding, former Dean, New York State College of Home Economics, and now President of Vassar College; Miss Frances Hall, Office of Food Programs, Foreign Economic Administration; Mr. W. L. Campbell, Head of Department of Food Technology, Massachusetts Institute of Technology; Dr. Robert S. Goodhart, Scientific Director, National Vitamin Foundation, Inc.; Dr. Israel Weinstein, New York City Health Commissioner; Miss Fannia M. Cohn, Secretary, Education Department, International Ladies' Garment Workers' Union.

To all these authorities, our Committee owes a debt of gratitude.

Acknowledgments

To the many other nutritionists, food experts, scientists, and physicians who assisted and cooperated in the work of our Committee, we wish to express our appreciation. The Committee wishes to acknowledge also the generous co-operation of newspapers and radio stations in publicizing various phases of the Committee's activities and related aspects of nutrition. We wish especially to thank Mr. Nicolas Apgar, artist, for his aid in illustrating our reports.

Committee Reports

The enthusiastic reception accorded the various reports of our

Committee has indeed been heartening. "The Nutrition Front" in 1943, "Food in War and Peace" in 1944, "Nutrition in Review" in 1945, and "Nutrition for Young and Old" in 1946 have received high praise from world leaders in nutrition, as well as from women's organizations, schools and colleges, and the lay press. Due to the overwhelming demand for these books, the supply has been exhausted.

Our present report is in two parts: Part I consists of this Letter of Transmittal. Part II contains numerous articles prepared by some of the foremost nutritional authorities in the world.

Respectfully submitted,

NEW YORK STATE JOINT LEGISLATIVE COMMITTEE ON NUTRITION

Senator Thomas C. Desmond, Chairman

Assemblywoman Gladys E. Banks, Vice-Chairman

Assemblyman Myron D. Albro, Secretary

Senator Seymour Halpern

Senator Thomas F. Campbell

Food and Foreign Policy

By Dennis A. Fitzgerald

Secretary-General, International Emergency Food Council

AT ALL TIMES food is important in foreign policies of the nations of the world. At present it is the most important element—it is fundamental. This was forcefully stated recently by Under-secretary of State Dean Acheson in an address before the Delta Council at Cleveland, Mississippi. Said Mr. Acheson:

“When Secretary of State Marshall returned from the recent meeting of the Council of Foreign Ministers in Moscow he did not talk to us about ideologies or armies. He talked about food and fuel and their relation to industrial production, and the relation of industrial production to the organization of Europe, and the relation of the organization of Europe to the peace of the world.

“The devastation of war has brought us back to elementals, to the point where we see clearly how short is the distance from food and fuel either to peace or to anarchy.”

The food produced in the United States, the food exported by the United States, the food consumed in the United States, and the food imported by the United States, all have a vital relation to the foreign policy of the United States. This Nation produces large supplies for export of some of the most basic foods. For other foods, this Nation is a heavy importer, and what it takes in the world market when supplies are short

plays an important part in determining what other nations can have.

To understand the importance of U. S. food production and consumption exports and imports in world affairs of today, it is necessary to take only a brief view of the world food situation.

War Devastation

The recent war was incomparably the most devastating in history. Over great areas the fighting and the bombing, the economic warfare strategy and the scorched earth tactics, destroyed not only factories and homes, bridges and railroads; these influences of war killed off the draft animals and other livestock, destroyed the tractors, broke irrigation works, displaced the people, and displaced or cut off trade so that farm people left on the land had little incentive to market what they could produce because there was nothing to exchange it for except depreciating paper currency.

Food production, therefore, has been cut down in Europe and in Asia and the islands of the Pacific; even in areas of tropical Africa where there was no fighting, but where the native populations slow down food production because there are no goods to get in exchange for their work, or because traders cannot buy the products since they cannot ship them out to

the ports because transportation is lacking.

Civil unrest in the Far East following the war has further cut down output there.

In short, food production is much less than prewar in wide areas which had to import food before the war. Now their needs are intensified.

The nations of the Western Hemisphere and the Antipodes, not physically devastated by war, have increased their production, weather permitting. The United States has increased its output remarkably, favored by good weather, and the skill and devotion of its farm families. Canada has done likewise. Just after the war, there was fear in some quarters that the prodigious production in these two nations might not find a profitable market in the world; that surpluses would crush prices. There have been no surpluses, however, in the first two years following the end of the shooting war. Consumers of the United States know this because they have been paying high prices in spite of the great food production in their Nation. They have, though, been able to get enough food. In fact, considerably more than prewar. Consumers elsewhere know there have been no surpluses from very bitter experience—they have been paying scarcity prices and have not been able to get enough food for health and strength and full working efficiency. It seems plain now that there will be no world food surpluses for at least another year.

In the past two years droughts in Europe, North Africa, India and Australia have cut the output of grains. At the same time rice output has gone far under prewar in the great prewar exporting areas of the Far East—Burma, Siam, French Indo-China, Korea, Formosa. Simultaneously, fats and oils production has decreased in the Far East and Africa, for reasons already mentioned, and in Europe because the shortage of grain makes it impossible to produce as much butterfat and lard and tallow as prewar. Also, the cut-down in animal numbers reduces the output of meat in Europe. Finally, the world sugar output is considerably below prewar because the Philippines and Java were knocked out of production and the world export market by war and its aftermath, and Europe's sugar beet output is much under prewar.

It is plain that in the past two years following the end of the war the importing countries of the world could not get as much as they wanted—and needed for good nutrition—of any food. It is also clear that the tendency in Europe has been to try to get more cereals and potatoes to make up for the calories in the diet formerly, but not now, provided by fats, meats, and sugar. Statistics presented in Table I, comparing prewar with present consumption of grain products, potatoes, sugar, fats, and meat in various European nations and in the United States, Canada, and Australia, clearly show what has happened. It will be noted that as the European nations have had smaller supplies of meat, fats,

and sugar, they have stepped up their consumption of grain products and potatoes. On the other hand, the great export nations of the Americas and the Antipodes, who have the food on hand, and have fed their hard-working people a diet high in meat, fats, and sugar, have not increased very greatly—in the case of the U.S., not at all—their consumption of grain products and potatoes.

In other words, as a result of the restricted diet of European nations in fats and oils, meats, and sugar, they are calling for even larger imports of grain than would be required simply to make up the decline in their own output of grain. The world demand for grain for import is abnormally high. This is the more true because the nations of the Far East try to make up with cereals for the calories which they cannot get by importing rice.

In the present food year, the importing nations of the world wanted 33 million tons of grain for what they regarded as their minimum needs. The exporting countries were able to provide only 28 million tons. The rice importing nations stated that they needed 6,500,000 tons of rice. The exporting nations were able to provide only 2,150,000 tons. The importing nations asked for over 6 million tons of fats and oils. The exporting nations could provide only a little more than 3 million tons. The importing nations asked for 1,375,000 tons of beans and peas. The exporting nations could provide only 420,000. So it has gone with all the basic foods. The

world supply has not been big enough to meet even minimum needs for health and good working energy.

Food Council

This is the situation which caused the nations to enter into the International Emergency Food Council. The Council is strictly a temporary international organization, providing a meeting ground and a method for the exporting and importing nations of the world to use in making a fair and efficient distribution of the foods that are in short world supply. The Council's committees bring together the nations involved substantially in the trade in beans and peas, cereals, cocoa, fats and oils, fertilizers (which are essential to food production), fishery products, meats, rice, seeds (essential to food production), and sugar. There is a committee for each commodity or commodity group. The committees try to reach agreement on the amounts available for export, and the division of the export supplies among the importing nations. The aim is to reach a rough equality of consumption of the commodities among the nations which import them.

The Council was organized in June, 1946, and started operations on July 1 of that year. It succeeded the Combined Food Board, the wartime organization set up by the United States, the United Kingdom, and Canada, to manage the world trade in food in such a manner as to contribute to the military purposes of the Allies.



U.S.A. pasture of tomorrow

The Council is endeavoring to reach international agreements which will help each nation manage its food exports and imports in a way which will contribute to the best world use of food in this period of rebuilding and recovery.

After the Council committees reach agreement on a recommendation for the distribution of a food in short supply, the schedules of imports and exports suggested are sent to the governments concerned. These governments, should they concur in the recommendations, put them into effect by controlling their imports and exports. More than 90 per cent of the world trade in the foods for which the Council has issued recommendations is now moving in accord with those recommendations. In brief, the pat-

tern of world trade in cereals, rice, fats and oils, sugar, meats, cocoa, beans and peas, and nitrogen fertilizers, is worked out by the nations through the International Emergency Food Council. This involves a great many restrictions on individual traders and no one likes it particularly. We all hope that it can soon be abandoned. The sooner the better. For its abandonment will mean that there is enough of a supply in the world of these basic foods and food production materials so that normal trade can be depended on to distribute the supply among the nations.

For the time being this is not true. We do not know exactly how small are the daily food allowances of the hundreds of millions in the

Far Eastern countries. They are pitifully small. For the European nations we have a compilation of rations for normal consumers—that is, those adults from the age of 20 upward not doing heavy work. This compilation appears following Table I with the thought that readers may wish to compare the weekly diets of themselves and their acquaintances with these meagre allotments. Of course, not all the food consumed by a European is obtained on the ration. There are restaurant meals, and there are black market purchases to be added. These were approximated in compiling Table I.

How long are such meagre diets to continue and to retard world recovery? It is not possible to say exactly for the weather will provide part of the answer, and weather cannot be foretold very far ahead. However, it does now seem certain that full recovery from world food shortages cannot be achieved within the next year.

Prospects for Coming Year¹

The continuing acuteness of the world food shortage following the recent war turns in considerable part on the shortage of rice in the Far East. This imposes an abnormal demand from that area upon the Western Hemisphere output of cereals other than rice at the same time that Europe is also in need of extraordinarily heavy shipments. Therefore we might look first at the prospects for rice. It now appears that production will increase both in the Far East

and in the Western Hemisphere as compared with 1946. But not nearly enough to satisfy the needs of importing areas. Hence, the Far East will continue during the coming cereal year to require abnormally heavy shipments of cereals other than rice from the Western Hemisphere and, if available, the Antipodes.

Cereals other than rice also are called upon to provide extra calories to replace those that are lacking because of the world shortage of fats and oils. Hence, the fats and oils situation should be considered before assessing the cereals position. It appears certain that world shortage in fats and oils will persist throughout 1948. It may not be so great as the shortage of 1947. But there will be a short-fall in the supply of calories from this source and thus further pressure will continue on the cereal supply, for it takes more than two pounds of cereals to provide as many calories as are provided by one pound of fats and oils.

With rice and fats and oils continuing short, the burden of demand for cereals will continue heavy. What are the prospects for supply? Not so good as everyone would wish. The United States, it is true, has a record crop in prospect. Conditions are excellent in Canada. This far before seedtime in the Southern Hemisphere only hopes can be held for a better crop in Australia and continued good production in the Argentine. But even if all these prospects and hopes are realized, the world cereal supply still will not be adequate to

¹ This summary on prospects for the coming year was presented by Mr. Fitzgerald in

his official report at the meeting of the IEFC on May 26, 1947.

provide for the basic caloric needs of the importing nations.

The bitter winter of 1946-47, followed by floods and delay to farming operations has tragically reduced prospective output in Europe. The situation is aggravated by a shortage of nitrogen fertilizers caused in considerable part by lack of coal to operate Europe's plants and of canal transportation during the frigid winter to move into the plants what coal there was. Even good weather from now on will not make possible a European crop large enough to bring European import needs into approximate balance with the export supplies of the Americas and the Antipodes. Two months ago upon returning from a brief trip to Europe, I ventured to predict that the prospective increase in food grain production in North America would not compensate for the prospective decrease in Western Europe. This prediction is rapidly materializing. The world cereal shortage will persist at least until the harvests of 1948.

This prospect, in turn, means a continuing shortage of meats in many of the importing countries, for the shortage of breadstuffs will make it necessary to use more coarse grains for human food and thus reduce the amount of feed available to rehabilitate livestock output. European meat production will increase somewhat, but will not come back to the prewar level. Western Hemisphere output also may go up slightly, but prices are high and the shortage of dollars in the hands of many importers together with their more urgent

needs for shipments of other things besides meats are limiting factors on meat exports from the United States.

The meat shortage, in turn, will continue to cause an abnormal demand for beans and peas and although production seems likely to go above last year, it will provide far less than will be required.

Sugar production probably will hold its own as compared with 1947 and may increase slightly. Cuba reports that she cannot be expected to repeat the high output of this year. Decrease there may be compensated or a little more than compensated by the return of the Philippines to the export market, possibly some supplies from the Netherlands East Indies, and possibly greater indigenous production in the importing countries of the world.

As for the supply of nitrogenous fertilizers, it threatens again to fall much too far below the amount needed for optimum yields of food crops. Coal is the major question mark. Will it come forward to the fertilizer plants in the amounts needed to operate them to capacity? In view of the competing demands for coal it seems doubtful. The best estimate is that nitrogen supplies will be short of requirements by as much as one-third.

In brief the early prospects for 1947-48 are for continuing world shortages in the major foods and fertilizers passing in import-export trade. The Council again, unhappily, must consider its future activities against a grim rather than bright probable supply-demand position.

This is the more disquieting because it extends further toward the breaking point the long strain which has been undergone by the nations in the deficit areas. Cereals, including rice, provide well over one-half the caloric food intake of the world's population. Limited supplies have necessitated restricting the consumption of bread and rice by hundreds of millions of people. Nor have supplies permitted a compensating increase in the consumption of other foods. On the contrary, in many countries consumption of fats and oils, meats and other important food commodities has been even more restricted. Sugar consumption, while higher than a year ago, is still generally below the prewar level.

The cumulative effect of these food shortages is becoming more and more serious, nutritionally, economically and psychologically. People are protesting more and more about the continued food shortages. In some instances, the protests have reached the stage of violence and rioting. Economic and industrial rehabilitation has unquestionably been retarded. Of special significance have been the effects of inadequate food supplies on coal production, in Asia as well as in Europe.

Rôle of U. S.

This bleak prospect for the world represents, in one sense, an opportunity for the United States. This Nation has the greatest capacity for production of the needed foods that exist on the face of the earth. This Nation has pro-

vided generously in the past two years. It broke all records in the amount of grain moved by one nation in one year. It amounted to over 14 million tons—over 500 million bushels—one-half the total tonnage moving in world trade. Prewar, the United States was exporting on the average some 600,000 tons—2 per cent of the world trade in grain. The United States this year is providing—believe it or not—10 per cent of the world's trade in rice. The United States is contributing heavily to the volume of world trade in beans and peas, and in meats.

The opportunity of the United States, on the one hand, is to continue to serve the cause of world recovery by providing large exports of the foods it produces in excess of its own people's needs. But that is not all. Another phase of the opportunity of the United States is to keep her consumption of the foods she imports at a point which will leave somewhere near a sufficient supply for the other nations that have to import the same foods. This applies to fats and oils and sugar, especially. To effectuate an export program which sends the food to the nations of relatively greatest need requires some special financing methods to enable some of the countries to get dollar exchange, for without it they cannot acquire our goods.

I do not wish, as an international official, to speak on the internal affairs of any nation, so I will not further press the point of actions necessary by the United States to realize to the full its opportunity to provide needed food and stimulate world rebuilding.

I do wish to point out that the United States has made its past contribution to ameliorating the world food crisis without weakening the diet of her own people. As a matter of fact, American food consumption has continued to go up during the war and the postwar periods until it is now at 116 per cent of prewar considering all foods. It is even higher in the so-called protective items—meat, milk, eggs, etc. The United States is not the only producing nation which has afforded its people a better diet than prewar as they carried on the hard work of unparalleled production and transportation during and after the war. The other major ex-

porters have followed the same course. It seems inevitable. Internationally it is the same type of behavior which occurs within a nation where, in times of food shortage, the people on the farms always fare better than those in the cities.

It will be possible for the United States to continue management of its exports and imports and its financing of international food trade without depriving her own people. And it will be, as Undersecretary Acheson pointed out, of the greatest aid to effectuating a foreign policy of peace and production and plenty the world around.

TABLE I
Average Per Capita Consumption of Principal Foodstuffs¹
(Kilograms per head per year)

COUNTRY	GRAIN PRODUCTS (as flour)				Potatoes				SUGAR (raw)				FATS (all uses)				MEAT ² (including offals)			
	Present		Prewar		Present		Prewar		Present		Prewar		Present		Prewar		Present		Present	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
France.....	125	118	143	165	26.1	19.8	21.3	13.0	39.4	33.0	31.9	41.0	40.9	47.8	23.5	23.5	23.5	23.5	23.5	23.5
Belgium.....	124	125	168	130	31.3	26.1	26.9	20.0	41.0	31.9	31.9	41.0	40.9	47.8	31.8	31.8	31.8	31.8	31.8	31.8
Netherlands.....	102	120	130	156	29.3	27.2	32.4	23.5	40.9	21.5	21.5	47.8	47.8	47.8	31.8	31.8	31.8	31.8	31.8	31.8
Switzerland.....	112	115	90	106	40.1	30.2	22.6	15.0	47.8	31.8	31.8	47.8	47.8	47.8	31.8	31.8	31.8	31.8	31.8	31.8
Denmark.....	90	112	100	108	56.8	33.7	36.2	25.5	64.0	52.4	52.4	64.0	64.0	64.0	52.4	52.4	52.4	52.4	52.4	52.4
Norway.....	120	126	152	34.2	25.7	31.2	26.0	35.5	26.5	26.5	26.5	35.5	35.5	35.5	26.5	26.5	26.5	26.5	26.5	26.5
Sweden.....	97	105	120	145	49.2	44.7	27.9	19.9	41.7	41.6	41.6	41.7	41.7	41.7	41.6	41.6	41.6	41.6	41.6	41.6
Finland.....	136	180	177	28.8	21.5	16.8	10.0	33.4	20.0	20.0	20.0	33.4	33.4	33.4	20.0	20.0	20.0	20.0	20.0	20.0
Germany:																				
U.K. and U.S.A. Zones.....	116	127	176	196	26.2	9.7	5.6	4.5	44.0	18.1	18.1	5.6	5.6	5.6	18.1	18.1	18.1	18.1	18.1	18.1
French Zone.....	118	100	222	222	26.2	7.6	28.0	4.5		16.8	16.8	28.0	28.0	28.0	16.8	16.8	16.8	16.8	16.8	16.8
Russian Zone.....						31.7														
Austria.....	130	127	85	141	26.9	7.0	19.0	9.5	50.0	20.0	20.0	11.5	11.5	11.5	20.0	20.0	20.0	20.0	20.0	20.0
Czechoslovakia.....	131	150	150	180	24.6	30.0	18.6	11.5	26.0	21.3	21.3	26.0	26.0	26.0	21.3	21.3	21.3	21.3	21.3	21.3
Poland.....	150	120	275	250	12.2	12.8	9.3	5.0	5.0	9.4	9.4	5.0	5.0	5.0	9.4	9.4	9.4	9.4	9.4	9.4
Yugoslavia.....	224	177	54	11	5.7	4.4	9.3	6.0	6.0	9.5	9.5	6.0	6.0	6.0	9.5	9.5	9.5	9.5	9.5	9.5
Greece.....	146	157	14	12	11.8	8.9	18.3	13.9	13.9	16.0	16.0	13.9	13.9	13.9	16.0	16.0	16.0	16.0	16.0	16.0
Italy.....	170	140	36	20	8.3	6.0	15.4	9.8	9.8	17.1	17.1	9.8	9.8	9.8	17.1	17.1	17.1	17.1	17.1	17.1
Australia.....	94	92	47	53	58.8	46.8	28.5	24.0	112.5	94.8	94.8	24.0	24.0	24.0	112.5	112.5	112.5	112.5	112.5	112.5
Canada.....	94	100	87	99	46.3	42.3	31.4	23.0	53.7	59.0	59.0	31.4	31.4	31.4	53.7	53.7	53.7	53.7	53.7	53.7
U.K.....	95	108	80	131	50.4	42.3	29.7	23.0	59.7	54.5	54.5	29.7	29.7	29.7	59.7	59.7	59.7	59.7	59.7	59.7
U.S.A.....	89	89	55	55	46.8	42.3	30.6	29.0	60.8	74.4	74.4	30.6	30.6	30.6	74.4	74.4	74.4	74.4	74.4	74.4

¹ Estimates for the current period are based on present programs and allocations as of May 1, 1947, and are to be regarded as tentative.

² Excluding poultry, rabbit and game.

AVERAGE WEEKLY FOOD RATIONS FOR NORMAL CONSUMERS IN CONTINENTAL EUROPE, EARLY 1947

Shown in grams (except milk, shown in litres)

Austria (for March, 1947)—
Bread, 3150; Meat, 210; Fats, 161; Sugar, 70; Potatoes, 1,400.
No milk ration.

Belgium (for April, 1947)—
Bread, 2,100; Meat, 420; Fats, 256; Sugar, 280; Potatoes, 2,100; Chocolate, 47. No official ration of milk.

Bulgaria (for March, 1947)—
Bread, 2,590; Meat, 300. No other rations reported.

Czechoslovakia, Bohemia and Moravia only (for March, 1947)—
Bread, 2,562 of which 250 grams can be exchanged for sugar;
Meat, 500; Fats, 176; Sugar, 350; Sweets, 25; Milk, .9 litre;
Eggs, 4 per period; Potatoes unrationed.

Denmark (for First Quarter 1947)—
Bread, 2,346; Fats, 250;
Sugar, 346; Oats and Barley Groats, 308; Tea, 23 (or coffee, 58). Meat, Potatoes, and Milk, unrationed.

Finland (for March, 1947)—
Bread and cereal products in terms of flour, 2,100; Meat, 93;
Fats, 116; Sugar, 117; Potatoes, 2,332; Salt, 116; Milk, 1.4 litres.

France (for April, 1947)—Bread, 2,100; Meat, 400; Fats, 116;
Sugar, 116; Cheese, 23; Coffee, 58. Potatoes, unrationed. Milk, no official ration.

Germany, British Zone (April, 1947)—Bread, 2,625; Meat, 150;
Fats, 50; Sugar, 125; Potatoes, 2,500; Fish (dressed), 125; Coffee Substitute, 31; Nahrmittel, 375; Cheese, 15.5; Milk (skimmed), .75 litre.

Germany, U.S. Zone (for April, 1947)—Bread, 2,500; Meat, 150;
Fats, 50; Sugar, 125; Potatoes, 3,000; Fish (dressed) 125; Coffee Substitute, 31; Nahrmittel, 375; Cheese, 15.5; Milk (skimmed), .75 litre.

Greece, for Capital area only, rations lower in other parts (for January, 1947)—Bread, 1,785; Meat, 75; Sugar, 180; Vegetables, 130; Potatoes, unrationed.

Hungary (for 1946-47)—Bread, 1,750; Flour, 280. No other rations reported.

Italy (for January, 1947)—Bread and maize flour, 1,645; Fats, 41;
Sugar, 68; Pasta and Rice, 226. Potatoes, unrationed.

Luxembourg (for February, 1947)—Bread, 1,980; Meat, 369;
Fats, 233; Sugar, 233; Potatoes, 2,800; Pulses, 70; Jam, 105; Alimentary Pastes, 117; Flour, 93; Chocolate, 35; Cheese, 23;
Sweets, 47; Coffee, 58; Milk, 1.75 litres.

Netherlands (for last half March, 1947)—Bread, 2,200; Meat, 250;

¹ Compiled by Food and Agriculture Organization of the United Nations.

Fats, 250; Sugar, 333; Flour, 25; Cheese, 100; Chocolate and Sweets, 150 (50 for smokers); Tea, 12.5; Coffee, 31.25; Cocoa, 6.25; Eggs, 5 per period; Milk, 2 litres. Potatoes, unrationed.

Norway (for March, 1947)—
Bread and cereal products in terms of flour, 1,750; Fats, 350; Sugar, 200; Potato Flour, 300; Cheese, full cream, 300; Cheese, other, 600; Coffee, 75; Milk, 1.75 litres. Irregular distribution of meat (mainly sausage, average 140). Potatoes, unrationed.

Spain (for January, 1947)—
Bread, 2,450; Potatoes, 2,000; Oil, .25 litre. No other rations reported.

Sweden (for April, 1947)—Bread and cereal products in terms of

flour, 1,061; Meat, 350; Fats, 250; Sugar, 359; Oat Groats, 123; Coffee, 80 (or Tea 32 or Cocoa 64). Potatoes and Milk, unrationed.

Switzerland (for March, 1947)—
Bread, 1,575; Meat, 385; Fats, 233; Sugar, 175; Oats/Barley, 117; Maize, 58; Cheese, 210; Flour, 93; Macaroni, 117; Jam and Marmalade, 117; Milk, 2.3 litres. Potatoes, unrationed.

United Kingdom (for April, May, June, 1947)—B r e a d , 1,786; Meat, 1 shilling, 4 pence worth; Fats, 198; Sugar, 227; Tea, 85; Bacon, 57; Cheese, 57; Candy, 113; Preserves, 113; Milk, 1.2 litres; Shell Eggs, 1½; Potatoes. unrationed.

Some Obstacles in the Path Towards an Optimum Diet

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THE OBSTACLES in the path towards an optimum diet are numerous. A good or an adequate diet may be defined as the kind and quantity of food which sustains the health and general efficiency of otherwise normal people at different ages. This is of course a rough overall estimate since we have no accurate quantitative measure either of health or of physical and mental efficiency.

An inadequate diet obviously is the kind and quantity of food that induces physical or mental impairments measurable by our present methods.

An optimum diet implies much more than this. It might be defined as that kind and quantity of food which permits and promotes optimum resistance to disease, optimum conservation of the factors of safety and powers of repair, and optimum length of life with optimum efficiency within the framework of the heredity potentialities of the individual and the species, and under the handicaps of the sequelae of accidents and disease.

In enumerating and discussing some of the obstacles still in the way of securing or using such a diet for men, I wish to make it perfectly clear that the order of their listing

does not in any way imply their relative importance. This we do not know. Colleagues working in the different fields will obviously rate these obstacles in very different order of importance but this is of little significance since many of them overlap, and provided that we recognize them all as actual or possible factors.

Lack of Knowledge

If the above definition of an optimum diet is accepted, it will be clear to most informed people that the sciences of physiology, nutrition and medicine do not today have sufficient knowledge to outline the components of an optimum diet. We do not know the optimum heredity potentials of any one individual. We do not know the tissue reserves that anyone starts out with at birth, nor do we have accurate measures of the depletion of these reserves until well advanced in the form of demonstrable or recognizable disease.

We do not even know all about the optimum soil fertility for the production of grains, vegetable and fruit of optimum nutrition value.

In experimental nutrition in animal husbandry the rate of growth, body size and body weight, are

* This stimulating discussion was delivered at the Clinical War Session of the Semi-Centennial Graduation of the Uni-

versity of Texas Medical School, December 18, 1942. Its basic challenges are timely today.

usually taken as a measure of superiority of diet within the framework of hereditary potentials and in the absence of recognizable sequelae of disease. But one may question whether the height and other dimensions of men are adequate measures of an optimum diet so far as these elements are determined by the diet.

I know of no evidence that the five foot ten inches individual is biologically, mentally, and economically, or even socially inferior to a six-footer. In some biological factors man is inferior to the gorilla, the tiger, the elephant and the horse. Yet he has survived and may some day conquer the jungle. **The measure of biologic fitness of the man of tomorrow would seem to be the capacity to produce, serve, and survive in the kind of environment worthwhile for men to live in.** It seems probable that in this task the size and plasticity of the brain is of more significance than the length of the legs or the width of the shoulders. The eight foot seven inch "Alton (Illinois) Giant" died at 22. At any rate the dinosaur and the mastodon are extinct but the ant carries on.

We do not even know whether the eating of proteins considerably above the minimum requirements for growth, tissue repair and nitrogen equilibrium, is biologically indifferent or whether it improves or impairs mental and physical performance, whether it shortens or lengthens the life span.

It seems clear, at least to me, that there is a large territory of unknown factors yet to be scientifically explored before we can talk

with any degree of certainty about an optimum diet for man. Therefore those who know the most in this field ought to confine themselves for the present to such terms as good or adequate diets, on the positive side.

If a good diet, or even an optimum diet, alone was omnipotent and could push back the hereditary limitations of the individual we should not so often see differences in physical and mental capacities of children in the same family at least not in the absence of accidents of non-dietary diseases.

If a diet of "red meat" alone was the determining factor on the football field there would be no scores on either side, outside of accidents and luck. Genius, like mortals made of common clay, can neither develop their best nor for long balance on a top rung of the ladder on seriously inadequate diets. It seems equally certain that even optimum diets will not build genius out of all clays. The persistence of hereditary factors and the unknowns of mutation appear to say that much.

Diseases Among Children

Drs. Park and Follis, Jr., of Johns Hopkins Medical School, have kindly put at my disposal their results to date of their significant and long study on the prevalence of rickets in the bones of 230 children between the ages of two and thirteen years dying of sundry acute and chronic diseases, primarily of non-dietary origin. They find signs of rickets in 46½ per cent of these children. The acute diseases ending some of these



—USDA photo by Osborne
Future health of America depends on
what youngsters are fed today.

children's lives appear to be of too short duration for the disease itself to have been the primary factor in the initiation of rickets although the disease might have aggravated the rickets. It is doubtful that the conditions of rickets in these children could have been diagnosed without this type of examination after death or biopsies of the bones during life. In my judgment this is a significant approach towards the study of incipient dietary deficiencies and a commentary on the society of today in failing to apply the known, for we have known for many years the dietary requirements for the prevention of rickets in the absence of disease.

Our knowledge of the composition of foods, the role of foods in the living body and the specific requirements for the main groups of foods in the living organism—the proteins, fats, starches, inor-

ganic salts, and vitamins—have increased enormously in the last 50 years. This detailed knowledge has, however, not gotten down very effectively to the man in the street, the woman in the average home, or the people in the factory and on the farm. More recently, the startling character of these biological and chemical discoveries in human nutrition has, to my way of thinking, led to much unfounded anxiety, fear, wishful thinking, and questionable commercial exploitation.

Whether or not we can maintain good health on 40 grams or on 100 grams of protein per day depends largely on the kind of proteins we eat, as the biologic or nutritional value of proteins differs greatly. Some 10 so-called essential amino acids are now known. These protein "building stones" are so called, because the human body cannot make them from the other nitrogenous elements in the diet. However, these essential building stones are present in varying amounts in nearly all proteins of animal and vegetable origin. Man's past history teaches us that if we eat a sufficient variety of natural foods, we will get all the essential amino acids needed for good health. Meats, milk, eggs and grains provide good food proteins. The first principle in adequate dietary proteins is accordingly: **variety, natural foods, omnivorousness.**

Up until yesterday even experts in nutrition thought that the nutritive significance of the animal and vegetable fats in our dietary, besides providing flavor, was: (1) energy or calories, and (2) carriers

of such dietary essentials as vitamins A, D and possibly others. It now seems highly probable that two or three of the numerous fatty acids in the animal and vegetable fats are as necessary in our diet as are the essential amino acids of the proteins. But, as in the case of proteins, nutritional welfare of men lies in variety and omnivorousness, since these essential fatty acids occur widely in plant and animal fats.

It is almost superfluous to point out that many diseases, acute and chronic, not primarily of dietary origin, may and do prevent, in part at least, the good effects of good diets. The infant with summer diarrhea no matter what food is given does not get the full benefit of that food.

This applies to many diseases of adults. In the presence of hook-worm infestation good foods alone do not seem to engender maximum physical and mental efficiency. Chronic lead poisoning in the child appears to so interfere with the use of the calcium and the phosphorous in the diet as to induce or aggravate the disease of rickets.

We are not now concerned with the important problem, the role of a good diet in the prevention or limitation of infectious disease. Diet alone does not seem to promise the conquest of infections. But when we speak of good or optimum diets for the entire population of the land we must keep in mind the non-dietary disease factors that nullify in whole or in part the good results seen from such diets in individuals having these diseases.

Food Habits

The food habits of man tend to become as fixed and in many cases as unreasonable as many of his religious, political, and social habits. The name of foods, the visual appearance of foods, as well as the taste of foods are frequently determining factors. The consumption of types of foods by people or races less sophisticated, more ignorant or poorer financially than we are—such foods are frequently looked upon by us as degrading, or not good for us. Many people refuse the meat of eels because this fish looks like a snake. Many people think that food good for dogs, cats, and hogs are by that token not good or fit for man. A control factor here is obviously social habits as well as the fact that we can train our palate to like or prefer even foods markedly deficient in some of the dietary essentials. For example, the liking of sugar, sweet drinks, candy. Now sugar is a good energy food and such preference for sweets is not serious provided we eat enough of more complete foods. If foods like pure sugar or pure starch become a large percentage of our daily diet trouble follows.

Wherever we turn in the dietary field, past and present, there appears an important factor of safety in *omnivorousness*. Very few of the natural foods contain chemical or organic poisons for men. Civilized man could be even more omnivorous than he is at present, but we do add serious chemical poisons (lead, arsenic, fluorine) to some of our very important if not neces-

sary food categories, fruits and vegetables. To be sure these insecticides are sprayed on important human foods, not with the intention of injuring man but for the purpose of rescuing good human food from insects.

However, one of the dietary unknowns today is this: How much of these protoplasmic poisons we can take with our fruits and vegetables during the lifetime without impairing our reserves, impairing our health. The consumer demands a perfect apple. We can see the "worm" or the track of the "worm" in the apple. The lead, arsenic, and fluorine on the perfect apple we either cannot see, or when we do see them we think it is more dust from the good earth. We should like to know whether the dietary health of our forebears was worse off with a worm in the apple, than is ours.

Modifying human food habits in the direction of better health and efficiency may come through necessity or dictation. It will probably not stay put except through understanding via the long and strenuous road of education.

In the matter of education in health to the extent that our health depends on food I think there is much yet to be done in our grade schools, high schools and colleges. In a not too distant past the teaching of health in our schools did not significantly transcend the tooth brush, alcoholism, sex and social diseases. Even today in many of our schools we find inadequate teaching of the fundamentals of health and nutrition. As if the matter of foods was a concern for

women students alone and the matter of general health a concern only of the physicians.

We have scarcely begun to realize that the modern sciences of chemistry and physics are so rapidly changing our environment and mode of life that proceeding today in the ignorance of our forbears we may travel into tragedy. Urbanization and industrialization renders it well nigh impossible for modern man to have access to the natural unprocessed foods available to our forbears of a thousand years ago.

Food Advertising

In connection with this discussion of the education of the public in health and foods one necessarily thinks of the positive and valuable role that modern commercial food advertising could play in this program. Unfortunately such commercial food advertising in the past has frequently been misleading and occasionally undiluted but artistic lying. People are urged to eat more of everything. If they could do that very thing they certainly would develop dangerous obesity. The 1942 advertising of a vitamin alleged to prevent or re-color gray hair on the human scalp is as yet without foundation in science. There are cheerful signs now that the more responsible food producers and food processors are being aware of their public responsibility in this field. Their responsibility is contributing to factual adult education as to food and nutrition in advertising their special ware. But it is discouraging to say the least, to have our Federal

Government leaders urge us (in posters, advertisements, and circul-lars): "*Eat Nutritional Foods.*" This is silly, and, if certain foods are listed to the exclusion of others, misleading. For an article which is not nutritional is not a food.

Food Processing

Food refining and food process-ing may impair the value of foods. These are numerous, such as polish-ing of rice, the milling of the germ, and much of the protein vitamins and inorganic salts out of such foods as wheat and other grains, corn, etc. Purification and hydro-ge-nation of animal and vegetable fats may take considerable if not all of the fat-soluble vitamins out of these fats. Modern preservation of food such as canning, freezing and dehydration is necessary in modern urbanization. Some food values are diminished unavoidably by these processes. Cooking, freez-ing and packing undoubtedly saves man from infectious disease but some food values are lost. It is a question of balance of benefits. Fortunately we do still eat raw fruits and some raw vegetables. The latter could and should be greatly extended.

Digestible carbohydrates occur usually in abundance in most of our natural foods. Except by heat to point of carbonization these food factors are not denatured or de-stroyed by food processing, baking or cooking, except that the sugars and water soluble starches may be lost into the cooking and canning liquids. Dextrose, the sugar of the blood, is a necessary constituent

for our internal environment. A large part of our heat and energy requirement can and should come from the starches. The starches are our most easily digested and on the whole the least expensive energy foods. So necessary is our blood sugar (dextrose) that, as in pro-longed fasting, the body appears to manufacture it from body pro-teins, and possibly from the body fats. It now seems clear that our body can do the same with the pro-teins and the fats of our common foods. Hence no specific or distinct dietary deficiency disease of man is known as due to too little starch in the diet. A form of malnutri-tion, obesity, may be caused by eat-ing too much starch, or sugars, as the carbohydrate in excess of our energy needs is readily converted to and stored as body fat. However, some of the important dietary de-ficiency diseases have come about, not by eating too much starch, but eating too little of the other impor-tant elements in the natural grains. I refer to the polishing of rice and the modern milling of wheat and other cereals for white or patent flour. The germ and the outer coats of the grain hold valuable proteins, vitamins, and minerals. Human dietary safety on this front would seem to be: go back to first prin-ciples, *putting the whole grain into the flour of the bread.* This can be done. We can learn to like it. If Great Britain (at war) can take an important step in that direction, why can't we? Fortunately, we still eat oatmeal, a whole grain food, having among other valuable nutrients, proteins of high biologic value.

I believe we could learn to prevent the oxidative rancidity of whole grain flour. If we insist on milling the grain and storing the flour, instead of storing the grain, and milling as needed, there are now known relatively non-toxic antioxidants to prevent the rancidity of whole grain flour that takes place on long storage. And until we have that problem licked, what is the matter with storing the wheat and milling the flour as we need it? I do not see any essential economic principle in storing the flour in place of storing the wheat. In my judgment, the recent addition of a little of the vitamins and minerals now milled out of the grain, and singing paeans of dietary salvation over this "enriched" flour and bread is not a sound policy either.

for today or tomorrow. Let us go back to first dietary principles on this front. The whole wheat, rye, oat, barley, corn and rice grain are among our most valuable and our least expensive protective foods. This is nothing new. We are told in the Book of Genesis: "Behold I have given you every herb—to you it shall be for meat."

On the whole, we can trust nature further than the chemist and his synthetic vitamins. Recently Professor J. C. Drummond, the scientific adviser to the British Ministry of Food, voiced his reluctance to put the dietary safety of a nation on synthetic vitamins, as a long range policy. He thinks we must, and should, provide the natural vitamins in the natural foods. I stand on that platform, until we

**EAT THE BASIC 7...
EVERY DAY!**

GOOD EYESIGHT PAYS

FIGHT THAT TIRED FEELING

TEN STRIKE FOR ENERGY

BUILDS MUSCLE

PROTECT YOURSELF FROM ILLNESS

ILLNESS

HELPS YOU DISH IT OUT

FOR STRONG BONES AND TEETH

EAT A LUNCH THAT PACKS A PUNCH!

know a great deal more than we do today about foods and human nutrition.

Minerals in Food

It appears true that for our forbears, except for the element iodine in restricted areas of the earth, the dietary need of minerals was efficiently met by the common non-purified, non-processed natural foods. So far as I know, this would still hold true, except for the cooking of such foods as meats, fruits and vegetables, and the habit of discarding the cooking water. To be sure the otherwise excellent natural food, milk, is so deficient in iron that an exclusive diet of milk for weeks or more, brings on an anemia due to the iron deficiency in the diet.

How does the American dietary stand as to some of the essential mineral needs, such as calcium, phosphorus, iron and iodine? The iodine deficiency in the states whose soil and water were depleted of iodine by the waters from ancient glaciers is now taken care of by putting the iodine back into our table salt. The iodine was there before our ingenuous chemists learned to take it out. Professor H. C. Sherman of Columbia University, has long held the view that the American diet is probably too low in calcium, and possibly in phosphorus, for optimum nutrition. The problem is complicated by the fact that a modicum of vitamin D is involved in the adequate absorption and utilization of calcium and phosphorus, particularly in the growth and maintenance of our bones. I wonder if the

possibility of a dietary danger in this field could not be met, universally and without cost, by adding a little calcium, phosphorus, and iron, to our table salt. This should offer no insurmountable difficulties, and there is no evidence that a slight excess above actual needs of these minerals works any injury to our health.

We are urged to drink milk especially for its calcium. Yes, milk is a good source for lime. But milk is a relatively expensive food, and even in our country with a plethora of foods, there is not enough milk to go around, at least as long as we insist on butter and cream for our table, and turn so much (50 billion pounds a year) of the valuable skim milk into channels other than human food.

How Much Vitamins Do We Need for Good Health

That the disease scurvy induced by prolonged subsistence on dried, cured and cooked foods, can be cured or prevented by eating some fresh or raw fruits, vegetables, potatoes, leaves, or grasses has been known for more than a hundred years, but the specific chemical substance involved (ascorbic acid or vitamin C) is of very recent acquaintance, and the precise role of this vitamin in our cellular health is still partly unknown. Pellagra, beriberi and rickets are old human ailments, but their precise etiology and partial conquest belong to the last 50 years.

The recent advances in our knowledge of the chemical nature and the biologic role of the vitamins have been so rapid and so

startling that, as usual, man's wishful thinking hopes to find in them the cure for nearly all the physical and mental ills to which the flesh is heir. In fact, the miracles now claimed by some misguided people for vitamin pills, natural and synthetic, rival the miracles of Lourdes. The giving a mixture of table salt, vitamin C, and Vitamin B, to workers in very hot environments, observing reduction in fatigue and heat prostrations, and concluding that the vitamins contribute to this desirable result is not a scientific experiment. For we know that under such conditions NaCl alone produces these results, and it is difficult to measure fatigue with accuracy. Vitamin concentrates are useful aids in the hands of a physician. **The tragedy and waste in the 1942 vitamin pill business is this: most of the people who can afford to buy them probably do not need them; most of the people who may need them probably cannot afford to buy them.** But a competent chemist assures that "intelligence and morality go together . . ." Since an ample supply of vitamins can foster a high intelligence, it has also the capability of fostering morality. If this be true, and if we further admit that lying and injustice are phases of immorality, the vitamin deficiency in the human race of our generation is indeed appalling! When we have the vitamins that prevent dishonesty and injustice, the millenium will have done. But as I read and listen to the 1942 propaganda for vitamin pills, I am led to suspect that at least some vitamin vendors do not take their

own medicines. They just sell them. And the selling noise is so loud that our attention is distracted from the more important role of adequate proteins in preventing one of the fundamentals in the overall malnutrition created by such catastrophes as crop failure and war.

Waste of Food

Waste of food in the family increases the cost of food to the family. It also contributes to food scarcity. Food waste in our country is partly avoidable, such as waste in the home, waste or neglect of fruit and vegetable on the farm, partly perhaps unavoidable such as that produced by oxidative rancidity of fats in the foods. I have already referred to the huge waste of skimmed milk, so far as this good food is turned into channels other than human food. The waste of food in the homes tends to increase with the economic prosperity of the family. It is not "refined" to clean the plate. It is a measure of prosperity and caste to waste food. When we are told that under conditions of war and food rationing in England and Scotland the economically more fortunate eat one-third less food than they did in times of peace, this probably means that they eat just as much food in war as in peace, if they can get it, but in war, they waste one-third less food in the kitchen and at the table. When nations are facing universal food shortage, the wastage of food in the home or on the road from the farm to the home may seriously contribute to national malnutrition. Much of this food waste is even today preventa-

ble but, we are up against individual and social habits and agricultural practices that will yie'd only to education or dire necessity. Some food wastage in the home as well as in the food processing industry appear to be based in part on the erroneous assumption that the least roughage on the food that we eat the better for our health. So we peel and prune fruits and carrots, cabbage and potatoes and with such peelings and prunings we decrease or eliminate valuable food elements. The facts are the normal human alimentary tract must have some indigestible roughage to work at its optimum and it will probably take millions of years before man has evolved, like that of the honey bee, an alimentary tract that can function on nectar and pollen alone. I am not aware that the roughage in the whole grain food, oatmeal, has damaged the alimentary tract of man. It is difficult to assess the blame for some of the waste of our food particularly the fats of animal origin. We seem to have developed the idea that the fattest hog and the fattest steer is the best hog and the best steer. These animals may be best in the sense of providing greater income to the farmer but a great deal of the fat of the steer and even some of the fat of the hog does not reach the human stomach. From the kitchen or dining table it passes into the garbage can or down the drain pipe.

Poverty

Many people are undoubtedly inclined to put poverty as obstacle

No. 1, even on the road to a good or adequate diet, not to say an optimum diet, and I am not quarreling with the relative importance of any of the factors, as I indicated in the beginning. Whatever the percentage of truth there is in the view that forty million, even a hundred million Americans are badly nourished, there can be no doubt that financial handicaps may be serious enough to prevent the purchase and consumption of food adequate for good health. And even if 1 per cent of our fellow citizens belong in this category in this land of abundance of good foods, that would be a reflection on our knowledge, education, wisdom and competence. But among men as among animals below man, securing food without labor, without scratching, leads in the long run to biologic deterioration. Among the wants and fears of man in many lands are the lack of good foods and the fear of starvation. Sir John B. Orr, the British war time food administrator has recently proposed that this seemingly simple aspect of the "Atlantic Charter" should be our primary concern. But even this is by no means simple. For in absence of epidemics, all species, man included, tend to reproduce beyond the limits of an adequate food supply for all. So a necessary corollary to freedom from the want of good food, and freedom from the fear of starvation everywhere, is planned parenthood. To me at least, this seems as humane, reasonable, and necessary as our civilized and scientific endeavors to prevent and control

the other form of universal human suffering, disease.

The financially poor, the financially unfortunate appear to have been with us throughout recorded history. The common saying is: "The poor will always be with us." Maybe so, at least in a relative sense. For there is also poverty in foresight and poverty in individual endeavor. In so far as this is due to poverty in heredity, common sense seems to say that, as knowledge grows, we must apply new measures to decrease the production of the chicks that chirp but cannot or will not scratch. Unless reason based on understanding effectively guides social evolution of tomorrow in that direction, I see no escape from the degeneration that invariably follows biologic parasitism, except the ancient law of "tooth and claw." The killing of millions of pigs for fertilizer, and restricting the production of such important foods as meats, wheat and corn, all by Federal regulation, do not (in my judgment) square with our concern for an optimum diet of man (the poor included) even in our own land.

Appetite

We know today very much less about the precise mechanism of appetite for food than we know about the mechanism of hunger, but stated briefly, appetite for food in contrast to hunger does not seem to be primarily inherited. It seems to be a memory of previous pleasant experiences with foods, pleasant experiences in the sense of taste, odor and visual appearance

of foods. One fact stands out clearly in the matter of appetite, and that is this: All normal people seem to be able to acquire a liking or appetite for any kind of substance that can serve the nutrition of man.

This, I think, is a factor of safety as well as a factor of danger for the human dietary. The factor of safety appears in the human capacity for omnivorousness, that is, consumption of a great variety of foods. The dislike or an actual revulsion to a monotonous diet is a drive towards variety, if not omnivorousness in foods. There is no doubt that this tendency or habit of omnivorousness will in part explain the dietary success of our forbears, and of the wild animals, in the absence of specific understanding of food requirements.

On the other hand, there is danger in combining the products of human ingenuity in the matter of food processing and food preparation with the capacity to develop liking for foods that are so defective in essential elements that when they are made a preponderant part of our diet, we may develop serious malnutrition. Three of such common foods today are the refined sugars, polished rice, and bread made out of our modern patent flour. These are good foods. We can, and we have developed appetite for them, but because of refinement, they are so defective in many essential dietary elements, that they can lead, in fact they have led, to nutritional disaster when they make up too large an element in our over-all food con-

sumption. I think it is particularly important to recognize the safety in dietary omnivorousness, to recognize the fact that we can and should develop liking for, that is appetite for, a great variety of foods as soon as feeding at the breast or by bottle is supplemented by the common foods of man, because these likings or appetite are probably most easily established in the early years of life.

When good food is abundant the gray squirrel eats the germ in the grain of corn and discards the rest. We eat the rest and discard the germ. The pregnant and lactating squirrel (a herbiver) eats bones when she can get them. So do cattle (another herbiver) ranging on land poor in lime. We do not know when or how these primitive appetites were lost to or suppressed in man.

The vagaries of appetite may lead to malnutrition in two directions. It may lead to eating too little (enerxia nervosa) or eating too much. The chronic and serious depression of appetite, usually has a psychological basis both in children and in adults, in fact it may follow a period of such great appetite that the person is eating to marked obesity. The criticism and the ridicule of this obesity by the obese person's friends, and associates, may ultimately bring on such a mental state that for weeks, months, and years, the eating of the very best of foods leads to vomiting. Fortunately these cases are not numerous, but obviously the cure here is neither more money, more food or better education as to foods. Perhaps the most

serious aspect of the vagaries of appetite as an obstacle on the path towards optimum nutrition is that condition where the pleasures at the table so dominate in the individual's life that eating to the point of obesity follows. To be sure obesity may parallel an incipient malnutrition of factors other than calories in the diet, but I repeat, in the experimental animals, at least, chronic deficiency in any one essential dietary factor impairs or retards both growth and weight. Since obesity is more than twice as prevalent in the American population as is underweight of equal degree, maybe we should give more attention than we have up to date to this aspect of malnutrition because, depending on the degree of obesity, this condition is a strain on the body reserves, renders man less fit for many tasks and shortens his life span.

Chronic Alcoholism

As a food alcohol is among the most defective and most expensive. . . . Curiously alcohol in moderation is not infrequently taken before or with the meals with the avowed purpose of easing or aiding appetite and digestion. No animal below man seems to need this stimulus, although it is proven that moderate amount of alcohol does increase the secretion of gastric juice whether or not we need that increased amount of gastric juice. It is well known that alcohol, acting both on the alimentary canal and possibly also on the central nervous system may induce temporary nausea, vomiting and anorexia and intolerance for food.

This is not a serious aspect when we think in terms of malnutrition. This comes in only in the case of those people who indulge in alcohol to excess and so constantly that consumption of food for adequate health is impaired, presumably by impairment of brain function, although action of chronic alcoholism in this direction on the alimentary canal and other organs of the body cannot be excluded. Obviously the cure of this form of malnutrition lies neither in supplying more or better food or more cash for the latter would be likely spent for more alcohol. This malnutrition is obviously secondary to chronic alcoholism and this in turn may stem from hereditary as well as social forces that so far as we know today do not spring from any form of malnutrition.

Governmental Barriers

A writer has called these Federal and state laws and regulations: "state barriers for starvation." I have before me a list of these Federal and state penalties on good foods. There is a federal tax of 10 cents per pound on colored margarine. This effectively prohibits the sale of this margarine in the United States. The experience in Europe and the United States goes to show that margarine palatable and of a nutritious value, in all probability not inferior to good butter, can be made out of vegetable fats or animal fats other than that in milk. Such margarines can be and usually are fortified by the addition of the vitamins present in milk fats. We usually add a non-toxic color to winter butter, without either labeling or taxing

it, but when this color is added to margarines our Federal government taxes it at 10 cents per pound. Ostensibly this law was enacted for the protection of the consumer against deception. That phase can be taken care of by labeling, for most Americans can read. Actually the law was forced on our country by a pressure group, and I fail to see where the law works in the interest of our fellow-citizens in the lowest income group. Were all Federal and state restrictions on good margarines swept overboard good margarine could probably be made and sold at half the cost of good butter. It appears that 30 states have themselves absolute prohibition against the sale of colored margarine. I am talking to citizens of Texas. Yesterday our train stopped at Temple, a city "deep in the heart of Texas," long enough for the passengers to find lunch. At the Santa Fe Cafe but-



—USDA photo by Forsythe
Get the point, boys? School milk means better health.

ter was not served with the bread and buns. I called the manager, and he informed me that butter could not be bought in that city. I asked for margarine. The manager replied, "I cannot buy or serve margarine without paying a state license." If this is so, it is a poser. For the State of Texas produces a great part of the fat (refined cotton seed oils) that go into the good margarines of today. Has statesmanship in national nutrition vanished? Twenty-nine states prohibit the importation of so-called "filled milk." That food is a combination of skimmed milk and animal or vegetable fats other than butter fat. This food, like margarine, can be and usually is fortified with the vitamins found in good condensed milk. Northern dairy states discriminate against margarine and "filled milk." Southern states retaliate by restricting dairy food from the northern states. It appears that several states recently have forced higher prices on dairy food by requiring inspection at the source of supply by officials of the importing state, an inspection duplicating that of the producing state. While these laws and regulations, state and Federal, are dictated by selfish interests rather than by the dairy welfare of the Nation as a whole, they probably do not play a large role in any malnutrition existing in our country in terms of numbers of people, except possibly among the poor. But it should also be said that any remedial measure tending to promote a good diet even for the poorest of our citizens should not be overlooked in our overall program for national nutritional welfare.

Wishful Thinking or Worse

Even at the risk of concluding this discussion on "a sour note" I designate the last "obstacle" wishful thinking or worse. We, the laborers in science, must examine our moorings, lest mirages and miracles replace proven reality, and we too become the blind leaders of the blind. I know as yet of no dietary factor automatically assuring even in a man of science the rule of reason every day.

A high ranking Government official in Washington said recently: "Defective stamina, intelligence, judgment, will, stability, can be treated by doses of synthetic vitamins." Since this Administrator is neither a chemist, biologist, nor physician, the information on which this extraordinary assertion is made must have been supplied by some one of our scientific colleagues, on whom rests the primary responsibility. Treated? Yes. These and other human impairments have had their therapies by the thousands. We all can "call the spirits from the wasty deep." But, do they come when we call them? If treated means treated with proved success, then it seems that a fractional potential has been turned into a universal affirmative. A cautious working hypothesis, such as the following: "Deficient diets, short of producing a full blown deficiency disease may be responsible for such vague symptoms as mental depression, indigestion, easy fatigue, loss of weight, retarded learning ability, and impaired vision," is termed a proven fact, without further evidence. The Administrator supports his statement

with the following tale: "Recently I was told that a western trucking company had actually achieved a reduction of its night accident rate by providing all its drivers with bags of raw carrots at the beginning of each trip." We are not told what the truck drivers did with these bags of carrots. Did they hang them around their necks, or did they chew and swallow them? Or was this little item not checked? If they chewed the carrots, somebody who knows should have told those concerned that chewing carrots or chewing the rag are aids to keeping awake, no matter what either may do for the rhodopsin of the retina in the way of better vision in faint light. I know of no statistics showing what factor drowsiness, apart from poor vision (night blindness), plays in the safe operation of trucks at night. Some years ago a New York physician reported improvement in the scholastic record of New York City's backward children by feeding them extracts of the pineal gland. That "promising" therapy seems to have passed on. Now, vitamin pills perform these miracles, apparently even when heredity has been niggardly, and accidents and disease have left their marks on the unfortunate individual.

We are told by a colleague in chemistry: "It is recognized already that one vitamin can and does cure mental derangements." This is stated without qualifications, while as a matter of fact mental derangements are due to a great diversity of factors, including heredity, mechanical and chemical trauma, and cerebral ischemia.

The value of the vitamin B complex in mental derangements seems to be largely limited to those accompanying advanced pellagra and chronic alcoholism. The 1942 faith and hope in universal health miracles from synthetic vitamin pills seems premature, if not immature. When I see our institutions for the feeble-minded and the insane, and the criminal evacuated and closed by giving any or all of our 1942 variety of vitamin pills to these unfortunate fellow citizens, I, too, will sing "Hosanna to the Highest." This scientist goes on to say: "Good diets, which mean an abundant supply of vitamins, promote intellectual keenness. . . . There can be no doubt that much dullness on the part of school children . . . can be traced in part to lack of the proper kind of food and especially lack of enough vitamins." These are broad and important generalizations. But I know of no evidence that an ample ingestion of vitamin pills will materially improve the scholastic record of the millions of children and young adults in our schools. These assertions are just too good to be true. Human biology is not that simple. Another colleague in chemistry tells us that the Germans "have enjoyed a more generous supply of thiamin and other vitamins which grains provide than have Scandinavia, the Low Countries, France, Spain, Italy, or the British Isles." Perhaps pacifism is a problem of malnutrition. Yes, the god "Mars" is traditionally pictured as a well-nourished specimen, and if good nutrition leads to war, and malnutrition to the striving for peace,

what kind of diet has enabled man to discover the scientific method, to develop a sense of justice, a spirit of fair play, a love, respect, and preference for truth and individual honesty? Are modern science and modern education sequelae of malnutrition?

Report on Malnutrition

Recently a subcommittee on Medical Nutrition of the National Research Council presented a report on malnutrition, under the heading "Recognition of Early Nutritional Failure" and with two tables of signs and symptoms. I fully agree with this Committee when it says: ". . . there is imperative need for (a) determination of the actual incidence of early deficiencies among the general population and for (b) the establishment of satisfactory diagnostic criteria for the recognition of such conditions." But after tabulating no less than 29 alleged signs and symptoms of early or incipient dietary deficiencies that even laymen might observe and diagnose, the Committee seems to wipe out its entire tabulation and report by this statement: "**Implicit in the definition of the problem and in the foregoing statements is the fact that no symptoms or physical signs can be accepted as diagnostic of early nutritional failure.**" Certain symptoms and physical signs, however, when verified by a competent physician and when other possible causes have been ruled out, should be considered as significant indications. If this latter statement is true, and I subscribe to it, their tabulation is misleading, if not

false in toto, insofar as present known facts of incipient dietary deficiencies are concerned.

The Committee lists lack of appetite as a sign of incipient malnutrition. This is contrary to my experience, both in man and in animals. I saw hundreds of thousands of undernourished people on the continent of Europe in the Winter of 1919, but, unless moribund, these people were eager for good foods. They ate the most unappetizing foods. At the end of over 40 days of complete starvation a person, otherwise normal, has an appetite for food keener than at the start of the fast. I have had dogs for various research purposes, fast much longer than 40 days. At the end, or towards the end of these long fasts, these dogs grab food eagerly. To be sure, the rat on a diet deficient in the vitamin B complex will after a while eat less and less of this ration. But it will, unless moribund, eat a better ration. So appetite is not lacking. But it is clear that appetite for food being seriously impaired by any cause, will ultimately lead to malnutrition.

Pitfalls in Nutrition Surveys

These alarming claims (100,000,000 Americans do not have a good diet) for national malnutrition in our land appear to be based primarily upon a series of surveys conducted by the Bureau of Home Economics of our Federal Department of Agriculture. These surveys embraced some 4,000 urban and village families of various levels of income and some 2,000 rural families of varying levels of

income, selected from representative regions of our country. The surveys consist in reports from these families as to how much money they spent for food, and what kinds of food were bought, and, in the case of rural families, how much and what kind of food they consumed from the crops on their own farms. These field investigators (some of them on WPA) had to take or did take the people's word for all of these alleged facts. It is impossible to determine the degree of accuracy as to memory of whatever member of these families gave the facts or alleged facts to the enumerators. The precarious character of such data should have been apparent to any scientist who is free to work and think.

On the basis of the kind and quantity of food bought or grown on the farms, the Bureau of Home Economics estimated the diets of these families as excellent, good, fair or poor. No physical or medical examination was made of the members of these families. Not even such a simple physical fact as the determination of the body weights of the people involved seems to have been undertaken. The necessity of such checks should also have been evident. The value of these statistics must largely be left up in the air as regards evidence for good or bad nutrition in our country by neglecting such an obvious factor as medical evidence of the health status of the people concerned, even though examination would have disclosed only advanced malnutrition.

Hopeful Signs

How does Dr. Parran's interpretation of these statistical studies by the U.S. Bureau of Home Economics check with data from other sources? Hospital statistics (admission, mortality rate) do not reveal significant national malnutrition in United States, except for pellagra in the South. Of course, the mortality statistics reveal only terminal malnutrition, and hospital admission statistics tell us only of malnutrition recognizable by present tests. Chronic malnutrition shortens the life span, but last year the average length of life of our citizens reached an all time high, or 63.42 years. There is some statistical evidence that our children are growing faster and taller than in the past, that college freshmen are taller than a decade or more ago. Children and youths do not grow faster or taller on inadequate diets. But we admit freely that these statistics do not cover our entire population. They are, however, indices. Malnutrition on a national scale does not lead to obesity, quite the reverse. This is certainly true of the experimental animal. And that was my observation in the war devastated countries in Europe at the conclusion of World War I. Recent studies by the Life Extension Examiners show that 10 per cent or more overweight is nearly three times more prevalent (28%) in the United States than 10% or more underweight (12.8%). It is a curious coincident that the percentage of obesity in our people should come so close to Dr. Parran's estimate of

the people having a good diet (25%). The obese may enjoy a good diet, but they do not use it wisely. Apart from pellagra, perhaps obesity is the most serious aspect of malnutrition in our country.

Nutrition of Draftees

If 100,000,000 Americans, in times of peace and food abundance, had poor diets, that should have been revealed on medical examination of our millions of young men for our Army and Navy. All these data are not yet assembled and analyzed, but according to Dr. Rowntree, the first 800,000 men, age 21 to 35, examined in the 1941 U.S. Army draft had an average height of 67.5 inches, or exactly the same average height as our drafted men in World War I. But the 1941 men were on the average 8 pounds heavier than the Army men of 1917-18. We do not know whether these eight pounds represent muscle, bone or fat. These

data on the 1941 draftees do not point towards an overwhelming malnutrition in our country. This should give us some assurance and some happiness.

But we should not be content, nor rest on the oar until we have discovered a more adequate test of incipient malnutrition; until we have cleared our land of myopic food practices, seen dawn of understanding dispelling our fog of ignorance as to the nature of health and the nature and role of foods; until we have reached first base, at least in driving pellagra from our homes. We have the knowledge as to both the causes, the prevention and the cure of pellagra. We have the food to do it. And yet we have made scarcely a dent on this national disgrace. No, my fellow citizens, the day of rest and contentment for the students of human health is out of sight in war, and will not be in sight with peace. For this road is long, tortuous, and difficult.

Significance of Wartime Advances in Food Technology

By Dr. W. L. Campbell

Head, Department of Food Technology, Massachusetts Institute of Technology

IT SEEMS TO BE the irony of fate that many of the advances made in food technology since the preparation of food emerged as an industry have resulted from the stimulus of war.

Let us consider the largest single branch in the food processing industry, namely, canning. The art of canning was invented by Nicholas Appert in France. He started his studies in 1795, urged on by the offer of a prize of 12,000 francs for better methods of preserving food for Napoleon's army and navy. He was successful in accomplishing his aims in 1804 and published his results in 1810. After the process was checked for the French Government by another scientist, Appert was awarded the prize.

The art quickly spread to England and was brought from there to the United States, where William Underwood opened his plant in the Boston area in 1820. However, the industry was just a specialty business until 1860. Then, under the pressure of feeding the Union armies, great strides were made. Up to that time from five to six hours were required to process a can of food at 212° F. In 1861, Isaac Winslow, by adding calcium chloride to the water, raised the processing temperature to 240° and reduced the time to from 25 to 40 minutes.



—USDA photo by Forsythe
A basket of vegetables for a load of health.

Canning had a tremendous expansion, which was carried forward after the Civil War armies returned home. Pasteur was at this time carrying on his studies in France, and some of his results were used by both sides in the Franco-Prussian War.

The basis of modern canning practice, however, dates from the studies of Prescott and Underwood at the Massachusetts Institute of Technology. The results of these studies were published in October, 1896.

History shows that there was considerable poorly canned food during the Spanish-American War.

The poor quality of the food was ascribable in large extent to deficient technical knowledge of the subject.

By the time of World War I, the American canning industry had developed to a high level. We had, in France, canned butter from the Central West, which, although slightly saltier than the normal American product, was far superior to the local French product, which often tasted more like cheese. In World War II the canning industry of the United States did a magnificent job, despite the shortages of tin. New protective coatings were developed, a wider variety of products were packed for the Army than ever before, and spoilage ascribable to any defects in canning technique was zero. For instance, Army rations in the Red Cross packages for our soldiers held prisoners in Japanese camps in the Philippines went all the way across Russia and Siberia to Vladivostok, where they were loaded on Japanese boats for the South Pacific. Butter spread dated September 1943, which had been subjected to all sorts of conditions from Arctic cold to tropical heat, was still good when consumed by the prisoners in November 1944.

We look on the Crimean War as the beginning of sanitary treatment of wounded and diseased soldiers, thanks to the work of Florence Nightingale, the founder of good nursing practice. Yet it is interesting to note that this war also marked the divergence from the so-called "iron rations", when bread of the American type was baked for the English Army by

Cyrus Hamlin in his American Mission School in Constantinople, which later became Robert College.

World War II Developments

In World War II the entire American food industry was marshalled to make the American Army and Navy the best fed armed forces in the world. Volunteers from American food plants assisted in the establishment of modern food processing plants in Australia and taught the Australians the latest American techniques. The Research and Development Branch of the Quartermaster General's Office designed rations to meet the most exacting demands of better palatability, better acceptability, better stability, better nutrition, better preparation, and less wastage. The representatives from the Chicago Quartermaster's Laboratory and Depot assisted industry in getting the items into production.

Complaints about the K ration are traced to the fact that it was used continuously under conditions for which it was never designed. The 10 in 1 ration, intended to meet the need for regular feeding of troops not able to be supplied with the B ration, was an outstanding accomplishment. The entire ration, sufficient to feed 10 men for a day, was contained in a package weighing less than 45 pounds.

A wide variety of menus was produced for the Army, including such new items as roast beef in gravy, roast pork in gravy, ham with pineapple slices, hamburgers,

frankfurts and beans, chicken with rice, ham and eggs, along with the old standbys of baked beans, hash, stews and corned beef.

The dehydrated soup needed only water to make it an inviting dish.

For breakfast there was cereal already mixed with milk powder and sugar, so that it needed only water to make it a ready-to-eat item.

A lemon powder with added vitamin C, and improved cocoa powder, and soluble coffee extract powder gave variety to beverages.

As dessert there were chocolate bars, fruit bars, jam with guava jelly added to it to increase the content of vitamin C, plum pudding, dehydrated blueberries, and dehydrated cranberries.

In the B ration a reduction in waste and a saving of transportation were effected by the use of frozen boned beef in 50-pound boxes. The whole carcass was boned and the excess fat removed at the packing house, where this waste could be utilized and the meat divided into three categories, hamburger, stewing and braising, and roasting and frying.

Research on dried fruit yielded a product with improved color, taste, and keeping qualities.

Dehydrated vegetables of improved quality compared with those of World War I were produced, but the length of transportation and the severity of climatic conditions in a global war often made the vegetables unsatisfactory at their final destination. Improvements to meet these handicaps continued right up to the end of the war.

Some of the products still in a developmental stage when World War II ended included a dehydrated orange juice with vitamin C content almost unimpaired, and canned bread. There were also cocoa and dried soups packed in double cans, with lime in the inter-space. From these a dish could be obtained without fire, just by addition of cold water. Likewise a dehydrated white potato was developed in granular form, which could be rehydrated in 90 seconds to make excellent mashed potato.

Post-War Application

How much of all this will survive in peacetime economy? Certainly many of the canned meat items will become available in the civilian market. A soluble powder of coffee extract is here to stay. Dehydrated soups will be offered in wider varieties and become more frequently used. The idea of the frozen beef and the improved process of drying fruit will pass over into the civilian economy. Improvement of some dehydrated products will continue, like dehydrated mashed potatoes and products dried in vacuum.

A number of techniques were developed during World War II in other fields besides food. Some of these will eventually find application in the food field, enabling us to have lower costs by continuous processes as compared with present batch processes. Also these applications will give products more closely approaching in quality the fresh garden-picked varieties than is at present possible.

The war caused great improvement in packaging, to withstand the abnormal conditions of transportation. This has already shown its results in the rush towards pre-packaged fresh produce, for packaging materials are now available that we never dreamed of before the war. As an example, I mention the butyl rubber base film, which has high-moisture vapor and gas impermeability.

As a result of the force of circumstances of the war, we have studied the food products of other nations and find some of them superior to some of our own products in nutritional value of vitamin and mineral content. This leads to the conclusion that the United States can, in many instances, be of more service in furnishing the technical talent to increase the production and use of native foods than by furnishing American meat, cereal, and dairy products to these foreigners who often are unaccustomed to their use and incur nutritional deficiencies by substituting them for products which over centuries have been fitted to their needs.

The American food industry is rapidly making further technological developments, aided by new ideas gained from the war experience. Consequently, we can expect canned products that more closely approximate the fresh ones, fresh products that more closely approach the peak of ripeness, processed products that retain the nutritional qualities of unprocessed foods, raw fruits and vegetables hitherto unavailable because of difficulty in transportation, and all

products packaged so as to require the minimum of waste and preparation by the housewife. These are not just hopes but are already in the laboratory stage of accomplishment. The production of such foods on a commercial scale is not far distant. Such progress is further indication of the power of American research and ingenuity.

By the use of such elements as heavy hydrogen or radio-active minerals produced from either the cyclotron or the atomic pile it is now possible to trace particular elements of the diet throughout the entire body. This has already indicated the necessity of a balanced diet at every meal, for ideal nutrition. I am told that one group of investigators fed rabbits on what might be termed a "bobby-sox" diet of sodas, candy, popcorn, hot dogs, and the like at irregular intervals and that within three months all these rabbits were dead.

We shall probably never reach that stage in some people's imagination where a meal will consist merely of taking a pill, because the minimum normal requirements of an adult in fat, starch, amino acids, vitamins, and minerals for a day amount to almost exactly one pound, exclusive of any water. Even in the most concentrated form, this means a pill the size of a hen's egg at every meal, rather a large pill! Nevertheless research under the war impetus, both in nutrition and in food technology, will give us a better understanding of what we should eat and the American food industry will provide it in the most palatable, attractive, and nutritive form.

Implications of Wartime Nutrition

Research

By Ole Salthe

Executive Secretary, Nutrition Foundation, Inc.

THE IMPORTANCE of nutrition in the prevention of disease was clearly demonstrated during World War II, according to a recent report by Dr. Thomas Parran, Surgeon General of the U.S. Public Health Service. Dr. Parran also gives credit to the Nutrition Program of the War Food Administration in coordinating the nutrition education activities for keeping our people strong and well-nourished during the war.

The amazingly good national wartime health in Great Britain was attributed to the British Nutrition Program. Despite the fact that the British diet was monotonous and restricted, it supplied necessary nutrients to more people than before the war, and particularly to infants, young children, pregnant women, and nursing mothers. Sir William Jameson, chief medical officer of the British Ministry of Health, gives credit to food planning for keeping Britain's death rate down, for keeping the infant mortality rate the lowest on record, and for the absence of serious epidemic disease, despite bombings and the stress of war.

The Office of the Quartermaster General of this country gives credit for the measureable decrease in the number of flying accidents to improvement in aviation feeding practices. During the war, tests

with the armed services confirmed the findings that human altitude tolerance was improved by pre-flight and inflight meals that were relatively high in carbohydrates. Meals of too low caloric content and long periods between meals were found to impair performance at either high or low altitudes. The gain in altitude tolerance ranged from one-half to three-fourths of a mile, as a result of a single meal.

During the war, liver injury caused by virus infections reached serious proportions within the armed services. Dr. C. L. Hoagland and Dr. Elaine P. Ralli demonstrated that by the use of high protein and high caloric diets, the period of convalescence was shortened by about 50 per cent, and the prospect of complete recovery was distinctly increased.

Nutrition Abroad

In July of 1946, the European Nutrition Conference was held in London, England. The countries represented included Finland, Sweden, Norway, Denmark, Netherlands, Belgium, France, Switzerland, Poland, Great Britain and the United States. Each country was represented by two delegates, one from the field of human nutrition, and one from the field of animal nutrition. The two delegates representing the United States

were Dr. C. G. King, Scientific Director of the Nutrition Foundation, who represented basic research in human nutrition, and Professor F. B. Morrison of Cornell University, who represented animal nutrition. Upon their return, they reported that there was a remarkable uniformity in the pattern of adjustments made in each country during the war:

An increased local production of potatoes and leafy vegetables;

Strict allocation of milk, eggs, fish liver oils, and special fruits to pregnant and nursing mothers and small children;

Intensive mass education regarding the conservation of nutritive qualities in foods;

Use of dark breads;

Rationing and price control of essential foodstuffs.

They reported that one could not escape a feeling of "thank God for potatoes"—or there would almost certainly have been widespread starvation and scurvy among our Allies. But with potatoes, fish and cereals, except for a few isolated "pockets" as occurred in Holland and in prison camps, there was little severe hunger and little evidence of nutritional deficiencies in any of the countries represented.

Every delegate seemed to feel that there had been substantial and permanent progress in the direction of recognizing the basic role that food must play in regard to health, agriculture and world problems of economy.

Current Progress

At a Symposium on the Current Progress in the Science of Nutrition, held in New York City on November 13, 1946, under the auspices of the Nutrition Foundation, Dr. Icie Macy Hoobler of the Children's Fund of Michigan said that the postwar aspects of our national nutritional program encompass the continuation of activities in behalf of our present adult population and their children but extend further, to a program for the eradication rather than correction of dietary deficiency and its later consequences. Such a program must have as its basic objective the improvement of maternal nutrition—to reduce the hazards of parturition, improve the nutritional status of the newborn, and increase the incidence of breast-feeding so that infant morbidity and mortality rates during the first few months of life may be lowered. Eradication of dietary deficiencies during childhood and adolescence must depend upon more complete information about the composition of foods, about the role of the various food constituents in nourishing the body, and upon educating the housewife to buy the proper foods and to prepare and serve them to obtain their maximum value.

Dr. F. G. Boudreau, Chairman of the Food and Nutrition Board of the National Research Council, who presided at this symposium, said:

"We began the war with a large capital of scientific knowledge in

various fields. During the war we added somewhat to this capital. In the main, however, we drew on our existing capital, and we failed to add significantly to our stores. Moreover, we made one mistake which should never be repeated: we neglected to maintain the human supply lines of scientific research. Students and graduates of scientific courses in the universities were allowed or constrained to join the armed forces, often for combatant service, and they were not replaced.

It will take years to make up for this wartime deficiency—for a long time to come there will be a shortage of science teachers and research workers. One of our most urgent tasks today is to recruit, train and equip new workers and teachers in science, so that we may not fall behind in the forward procession of the nations."

Dental Caries

The army records in World War II tell us that their 15,000 dental officers were called upon to repair 680,000 dental plates; that for every 100 men inducted, dental plates were required for 15 (8.3 per cent needed full upper and lower plates); and for every 100 men inducted they had to perform 60 to 80 extractions.

With a new type of experimental animal (the cotton rat), Dr. C. A. Elvehjem and others at the University of Wisconsin have shown that good, all-round nutrition can play a dominant role in preventing tooth decay. Soluble sugars can aggravate or increase the tendency



Proper eating cuts down dental decay.

toward decay, but they do not contribute all the trouble, or inescapable trouble, by any means. The fats, carbohydrates, proteins, minerals and vitamins all have a part in the picture. Milk, for example, instead of supplying damaging bacteria and sugar to dissolve the teeth, actually affords strong protection, in multiple ways.

Anemia

As late as 15 months ago, physicians had no clear basis for understanding either the cause or cure of certain types of anemia that are common in America. In a recent report, Dr. C. G. King, Scientific Director of the Nutrition Foundation, said that the vitamin deficiency that is involved in certain types of anemias can be corrected by any one of a number of fresh foods. The active material is easily lost, however, when foods are proc-

essed or stored at room temperature. This is but one of at least five vitamins that can be lost easily from foods. Hence another milestone has been reached in the food chemist's struggle to know what he is working with. Whether the farmer's product is beefsteak, bananas or spinach, the chemist can now measure what is there, and be guided in his work to serve and protect the public. Likewise the physician can work more intelligently and can think more clearly in terms of food. Accordingly, food has gained increased standing as an item in the family budget, because the relation of food to health is more clearly established.

Proteins and Amino Acids

Dr. W. C. Rose, at the University of Illinois, has established the human adult requirement, in a qualitative sense, for eight of the twenty-three amino acids common to protein foods. He has shown that the exclusion of each from the food was followed by a pronounced negative nitrogen balance, a profound failure in appetite, a sensation of extreme fatigue, and a marked increase in nervous irritability. Having established the qualitative needs, Dr. Rose is now working on the quantity requirement of each of the eight essential amino acids. This work is already recognized as a landmark in the science of nutrition. The value of whole protein as supplied in food-stuffs, in contrast to the purified amino acids, has become clear. In other words, the body's best use of protein goes beyond the mere mat-

ter of supplying a chemical mixture of the individual amino acids.

Closely related to the requirement studies just cited, are the discoveries regarding how the protein fragments react after they are taken into the body. It is obvious that after a meal, the proteins and their products get all tangled up with sugars, fats, vitamins and minerals, so they have to be considered as part of the *total* food intake. Medical and agricultural scientists need to know the pathways that they travel after they enter the blood stream and continue their work in all parts of the body.

Dr. V. DuVigneaud (who recently reported the synthesis of penicillin) demonstrated that two of the protein fragments and one of the vitamins are interlinked, in reactions that occur in the human liver and kidneys. Dr. C. A. Elvehjem and his associates have similar work under way at the University of Wisconsin. Another study has since found that one of these compounds can be a deciding factor in protecting animals against cancer. Two of the Nation's leading cancer research laboratories are joining in this type of study.

Diabetes

The findings of Dr. Carl F. Cori, of Washington University, and others have given substantially new insight into how sugars are used to support life and to provide more than half of all human and animal energy. The work has an added interest because it contributes to understanding the common disease, diabetes. In the United States alone, there are about two

million people with that handicap. Many of them are on special diets. Yet there is sharp disagreement among leading physicians regarding the kind of a diet that these patients should have. Barely enough animals are being slaughtered to provide the insulin that is used in treating diabetics. Without the hormone, sugars cannot be burned normally, but there is no factual basis for thinking that carbohydrates cause the disorders. Furthermore, the chief damage to the body of a diabetic person, when the disease is established, is generally caused by products of a fatty nature. In addition to Dr. Cori's group, Dr. C. H. Best, co-discoverer of insulin, in Toronto, Dr. G. M. Guest in Cincinnati, Dr. E. H. Stotz of Cornell University, and Dr. H. T. Clarke of Columbia University are at work on allied problems.

Foundation Work

In the advances cited, I am happy to report that the Nutrition Foundation has been privileged to support a number of these studies, which have contributed such important information to the science of nutrition. While not a development of the war, because it was conceived and organized before the war, a new form of research organization has been developed during the war period for the purpose of providing basic information in the science of nutrition. The Nutrition Foundation was founded by the food industry as an acknowledgment of their responsibilities in the protection and advancement of health through scientific progress

in nutrition. The entire program is one of public service and distinguished representatives of the public serve on the governing body.

The Foundation is completing its first five-year cycle. During this time it has made 133 grants, totaling \$1,267,305, to 53 universities and medical centers in the United States and Canada. As a result of these grants, important advances in the knowledge of the science of nutrition have been reported, which include:

1. **Advances in knowledge of the relation of nutrition to maternal and infant health, diabetes, anemia, bone healing, liver injuries, tooth decay and increasing the useful life span.**
2. **Advances during the war regarding food intake and fatigue, nutritive losses in food during preparation and storage, and increasing altitude tolerance among aviators by means of food intake.**
3. **Advances in knowledge of the essential nutrients, i.e., proteins and amino acids, vitamins, carbohydrates, fats, and minerals.**
4. **Advances in the development of reliable and accurate techniques for the appraisal of human nutritive status.**
5. **Advances in knowledge of new and more accurate methods of measurement and analysis of essential nutrients, especially amino acids and vitamins.**
6. **Advances in education, in**

that during each of the last five years, approximately 200 young persons of outstanding promise have received advanced training in the science of nutrition.

7. Advances in bridging the gap between substantial research findings and their acceptance with confidence on the part of those who deal with the public. Through the publication of **NUTRITION REVIEWS** by the Foundation, unbiased, authoritative reviews of current research literature in the science of nutrition is made available to professional trained people all over the world.

In a paper published early in 1946, in *Nutrition Reviews*, Dr. C. A. Elvehjem of the University of Wisconsin listed some of the studies in nutrition which need attention in the next 10 to 25 years. Dr. Elvehjem defines optimum health to mean: adequate growth during infancy, normal efficiency

during active life, normal reproduction, normal longevity, and a complete life with the least discomfort and disease and the greatest amount of well-being. He says it is not sufficient that we give generous amounts of each new nutrient. A specific nutrient may be more beneficial at a low level than at a generous level. In order to study these effects, he says, we must know what happens to food in our bodies. This means not only the changes occurring in the digestive tract, which is a field that needs tremendous study, but also the reactions that take place in the cells themselves.

Without enumerating the many questions Dr. Elvehjem raises, it may suffice for the purpose of this paper if I quote one of his concluding sentences: "There is plenty of indication that nutrition is still a young science and that we have a long, hard road ahead if we are to have a true, scientific knowledge about nutrition." His paper is most stimulating, in emphasizing how little is known about nutrition.

Some Recent Contributions of Agriculture to Nutrition

By Dr. Callie Mae Coons

Assistant Chief, Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture

WE ARE all aware that the effects of agriculture on the nutrition of our people are inescapable. Unplanned, they may be the worst. Even today in many parts of the world men, women, and whole families toil side by side for most of their working hours to wrest from the soil a food supply which too often is insufficient for health and vigor. Perchance the results may be good if the sun and rain, the soil and season, and other conditions of growth concur favorably for the production of a balanced food supply.

However, much favorable conditions exist in few parts of the United States or of the world. Consequently, agricultural planning has been directed generally toward the production of the most adapted crops, be they food, feed or fiber. Too often a motive of immediate profit to the owner has overshadowed consideration for the long-time welfare of those who till the soil. To this end also, modes of production have been improved and mechanized to increase the quantity and quality output of the best adapted crops. Thus agriculture has come to be a specialized industry of one kind or another, and with it has come the intricate system of necessary distribution and exchange of products, from producer to manufacturer and to consumer.

From earliest times the primary reason for agriculture has been its gift of food to men. So long as families had to depend on whatever food could be produced locally and conserved at home, the management of food supplies was largely a family and community matter, and nutritional status was more or less imposed by nature. Sometimes nature has been most unkind, as revealed so forcefully in the Food and Agriculture Organization's World Food Survey of July, 1946. Many a nutrition lesson can be learned from the study of this material — which groups of foods some nations have come to subsist upon largely, which they endeavor to get when they can have more, how their food habits relate to their status of size, health, mortality and other indices of well-being. As agriculture becomes a specialized industry, committing whole segments of her population to intensive cultivation of a few most adaptable and profitable crops in a given section, the responsibility for better human nutrition of the people of the land and also of the consumers of the cities shifts more and more to an agricultural industry, and can be accomplished only by a thoroughly planned one.

Agriculture has accepted this challenge that the moral responsibility is to strive for better nutrition.

The moral responsibility for agriculture grows as more than half a population comes to look to a "lesser half" engaged in agriculture for a balanced food supply to be available in the markets at all times, and each half to the other as thriving traders with whom they can barter and exchange their produce.

In view of this evolution of agriculture's responsibility toward human nutrition, what are some of the ways in which agriculture in this country has been meeting the challenge? Many were demonstrated during the war period—goals for production, programs for food management and control, home gardens production and conservation of food supplies. Besides, all these were underwritten with an agricultural research program that reached into every State and territory, and influenced as never before in history almost every phase of agricultural effort in the direction of better nutrition.

Consumption Trends

How much good has been accomplished? One excellent measure of the resultant effect of several forces of food supplies and on diet patterns may be seen in the U. S. Department of Agriculture report on "Nutritive Value of Per Capita Food Supply, 1909-1945." It shows how agriculture can meet the challenge in production if more food is demanded. For example, over the years the supply of dairy products has risen steadily, with a very sharp rise in the last decade. There has been a four-fold increase

in the consumption of citrus fruits since 1909. The consumption of green and yellow vegetables has almost doubled; increases in these three groups of food have meant striking increases in the calcium, vitamin A, vitamin C, and riboflavin content of the diet—all critical nutrients in the daily fares of many families.

Some of this increased food consumption was because consumer demand was buoyed by higher purchasing power, incomes pushed up and food prices held down. Some was the result of education—greater consumer demand because of dietetic emphases, such as in the widely-publicized basic seven program, better lunches at work, and the breakfast campaign. A combination of other forces is seen in the trends for other nutritive values. The thiamine and niacin values of the food supply went lowest in 1935, when a sharp fall in the meat supply, especially pork, was superimposed upon a long-time downward trend in the consumption of grain products, most of them highly milled. By 1938 greater purchasing power was meaning more meat consumed, and by 1941 the enrichment of a large proportion of flour, bread and cereals served to offset some of the losses from milling. The result was that the thiamine, niacin and iron values of the food supply rose sharply, almost skyrocketed to the end of 1945. Needless to say, much ground will be lost if the gains made by enrichment programs are not sustained or better ones provided, and if the supply and price situations combine to force meat



Reaching for health.

consumption back to lower levels.

The average figures do not mean that everyone was using more of all the various foods, but they do mean that some of the low-consuming population groups were using a great deal more, sufficient to raise markedly the average for the entire population. The net result was an American people better fed in the years of the recent war than at any other time in the 37-year period.

This chronicle of food supplies does not reflect all of agriculture's expanded effort in the war years. In addition there were the huge quantities of grain, meals, fats, dried eggs, milk, and vegetables which went out to help feed the remainder of the world. The accomplishment demonstrated agri-

culture's tremendous capacity, even in the absence of much of her best manpower, to produce more food for farm home use, for urban consumers, and much for other nations. If properly guided and assured a reasonable economic stability, agriculture can make possible more and more of the most needed foods for supplying the scarcest nutrients to insure an adequate diet for all her people, and some food to share.

On the other hand, programs for increased food production in periods of emergency or under steady growing consumer demand can proceed only so far in time, place, or type of crop and animal until limitations imposed by rainfall or season, by soil fertility or land erosion and other forces are

encountered. In one way or another, the efforts of agriculture are surmounting many of these difficulties, by conservation of water and of soil, by gradual restoration or maintenance of soil fertility, and by development of more hardy plants, long-season varieties and year-round cropping methods.

Distribution Problems

Wherever the difficulties of soil and climate are insurmountable, they can be met more easily nowadays by shipping and transportation, activities of food distribution not entirely beyond the control of an organized agricultural industry. In the past, agriculture may have been little concerned with modes of shipping, with methods and degree of processing her foods, or with the practices in marketing used to get the kind and variety of foods needed for a balanced diet to the people in both rural and urban occupations. However, hopeful signs are appearing along many fronts—legislative, industrial and educational—indicating that the time has come for agriculture to take definite action about what happens to her food produce beyond the farm gate—in fact, all the way in transit to the consumer's plate. It is time for belated teamwork among producers, shippers, processors, and retailers in discovering *more* and correcting *many* of the faults in the present system of food distribution and management. Food produce, unlike such raw materials as ores and petroleum, is perishable and much of it ready for the consumer with

little or no processing. Too often it has become deteriorated in quality during shipping, robbed of vital elements in processing, and finally offered to the public with little or no information or warning as to its qualities and usefulness in building an adequate diet. Many urban families during the war had the delightful experience of learning to like vegetables fresh, directly from their own garden to the table often with less than one hour delay, the same kind of vegetables as had been commonly rejected at the quality levels found in markets days after the vegetable was harvested.

Research Needed

A body of sound research facts is essential to give guidance to all these efforts of agriculture. Food and nutrition research programs supported by agriculture have made notable contributions in the last half century and especially in the last decade. Not only has agricultural research shown how to produce more food but also better quality and wider assortments, by its intensive studies of variety and breed, of necessary growing conditions, crop management, harvesting and farm storage. As illustration of what is possible, already the research is meaning better and more acceptable vegetables, such as beans, broccoli, celery, peas, corn, and sweet potatoes; gradually better fruits, such as berries, citrus fruit, melons, peaches, tomatoes; also dairy products with higher nutritive values, and even now turkeys with more meat per carcass,

and better eggs that stay fresh longer. Much remains to be done but some work is under way in almost every state.

Much data from investigations in food composition are required in estimating the nutritive value of the food supplies of a nation, of families, and of individuals, as well as in assigning priority ratings to specific foods. Before the turn of the century, scientists in the Department of Agriculture and in some of the State stations were busy making laboratory analyses of foods and their utilization by human subjects. They were studying the protein, fat, carbohydrate and caloric values of foods—the chief dietary constituents known to them in that day and just as essential now as they were then.

In the first quarter of this century, researchers in the Agricultural Experiment Stations pioneered in proving the importance of various minerals—iron, iodine, calcium and phosphorus for man and animals. Also, they have been foremost in discovering the existence and role of vitamins, first the fat-solubles, then the water-solubles. Still today some Agricultural Experiment Stations are in the lead in untangling the unknowns in vitamin research. The big impetus given during the war period to the study of food values, how to conserve them, which foods to give priority for what nutrients, will continue to be felt for some time to come. During the year 1946 over 400 research projects in foods and nutrition were in progress at State stations sponsored by Federal, State or other funds. Ad-

ditional ones were in progress at regional and Federal laboratories.

One most recent heartening move in the direction of better nutrition is the opportunity created by the passage of the National School Lunch Act. It is another step toward focusing attention on the people who are to eat the food which agriculture produces. The job of the successful execution of the school lunch program is a gigantic one and cannot be accomplished by one or two agencies or any one level of administration.

Certainly some of the best scientific thinking and research effort must go into finding out which foods are most needed where; how agriculture's bountiful supplies can be channeled to schools on the basis of specific need rather than empirical, how the meals at school can best supplement home meals, what is the nutritional status of the children and how the foods they need can be made acceptable to them and eaten, so that all this labor will not be lost.

It is not difficult to see how the functioning of a good school lunch program can open up new vistas to agriculture—locating the "soft spots" in the nutritional status of the population, indicating the food habits of people and where improvement is needed, showing which foods should be produced in still greater quantities, and how distribution may be better fitted to the requirements of groups in various sections of the country. It will also reveal which areas of nutrition research should be given priority for further investigations.

Of course, all of agriculture's best effort toward better human nutrition must be linked with those of other welfare groups—other researchers, men of medicine, legislators, civic groups, all along the line to the homemakers who can make or break the success of the program. The good homemaker strives faithfully to serve regularly

to her family adequate wholesome meals too attractive to be missed, too tempting to be resisted, least of all by the hurry-go adolescent. But she needs good food to begin with, and if better nutrition is to be achieved in the next generation, it must begin with the children now.

Postwar Problems of the Frozen Food Industry

By Clarence Birdseye
President, Birdseye Food Corporation

FROZEN foods is an infant industry. I think, at the outset, we should start out with a definition, so I am going to give you what I consider a highly scientific and accurate definition of an infant: It is an alimentary canal with a loud noise at one end and a total lack of control at the other. I think that is as accurate and scientific as any definition of an infant may be. And then I might add that the future depends upon minimizing the noise and the lack of control, if we are to succeed in our purposes.

Before we can consider frozen foods intelligently it seems to me we should appreciate the size of the perishable food industry—foods and grains, and so forth—and also the competition which frozen food will meet in the future. There are few people who appreciate that the frozen food industry alone has in dollars of sales, the number of employees, and dollars invested as much as the entire automotive, the entire steel, the entire railroad and the entire chemical and the entire textile businesses combined. Certainly anything with the importance of a thing of that sort is more than worthy of consideration by everybody.

Secondly, we have perishable foods to consider—the so-called fresh foods. Also, as the standard goes up the consumption of perish-



Raiding the ice box.

able foods in relation to the total foods increases.

Freezing is only one of the very many classes of preserving perishable foods and getting them from the servicing point to the ultimate consumer. I think we should discuss very briefly the "Big Four" methods of perishable food preparation for distribution—and except for preserving temporarily by above-freezing temperatures they are canning, freezing and dehydrating.

Is Fresh Food Fresh?

Sixty per cent of all perishable foods are today consumed in the

fresh form, and yet those so-called fresh foods are very seldom fresh. Ninety-five per cent of all the fresh food used—and there I am using a quotation—is not fresh.

For instance, with fresh fish, the minute you get into the kitchen when it is being cooked you know it is not fresh, because fresh fish doesn't smell fishy. Vegetables and fruit begin to deteriorate the very minute they are harvested, and in 24 hours lose a substantial percentage of their vitamin values. Not only is that true but the different varieties of the same vegetable or even the same vegetable grown on opposite sides of a fence vary tremendously in the so-called hidden food values. We speak of an apple a day keeping the doctor away. That may be a completely false theory. The most popular apple in New England, for example, has no vitamin C content. It is almost worthless as a source of vitamin C. The Baldwin, which the New England variety has replaced, has several times the value of the New England one. One type of blueberry is wholly lacking in vitamin C; another type is rich in it. Some vegetables grown in the heart of Boston, in back lots and small truck gardens, are literally fresher than the vegetables grown on farms in Lexington, Mass., and trucked in 18 to 20 miles to Boston. That is brought about by poor distribution.

On the other hand, the distribution of fresh foods is now being revolutionized. Along about 1938 or 1939, a small concern outside of Boston started to dress vegetables

mechanically at the farm, to package them attractively and to ship them under refrigeration to retail stores. That method is good and is increasing faster than even quick freezing is and, in my opinion, it has tremendous possibilities from a health point of view because it is likely to keep fresh vegetables fresh.

I want to go a little bit further to state that a large part of the statistics and the charts that are used in outlining proper diets are rendered almost valueless by the tremendous variation in the vitamin and mineral values contained in the various foods. A carrot is not a carrot; a cabbage is not a cabbage. They may be all sorts of things, from a varying point of view. Not only that, but frequently the discarded parts of vegetables are more valuable, from a food value standpoint, than the more expensive parts. The leaves of broccoli are as valuable, if not more so, than the heads and stalks. The leaves of cabbage and lettuce have a greater content of vitamin A than have the hearts.

Canning

It seems to me canning is so well known I don't even have to discuss its advantages. The fact that canning makes the foods practically imperishable has brought canned foods into practically every home throughout the civilized world.

Canned foods, because of their great convenience and substantial imperishability, have become an integral part of the diet of all civilized peoples and an important

factor in the health of every American family. Even canned foods, however, are not without serious disadvantages. They are necessarily overcooked and therefore cannot closely resemble the fresh product in appearance, flavor, and aroma. Moreover, they are bulky and lose some of their vitamin content during prolonged storage at room temperatures. Canning practices are constantly being improved, and it is entirely possible that some revolutionary new process may greatly change the competitive position of canned foods.

Frozen Foods

The great advantage of frozen foods is that at their best they are actually fresher than the "fresh" foods consumed by the average American family. That is true because quick-frozen foods are processed, packaged, and frozen very soon after harvesting and thus escape the deterioration to which "fresh" vegetables are subject during the long journey from producer to consumer. Very little loss of vitamin and mineral value occurs during the freezing process; and loss during subsequent storage, transportation, and retailing may also be slight. Moreover, frozen foods are convenient—a quality of the greatest importance in bringing them into general use.

Such are the advantages of frozen foods. Their one great disadvantage is that they must be kept constantly at uniformly low temperatures.

Dehydration

The great economy inherent in the production and distribution of dehydrated fruits and vegetables is typified by the fact that while one carload of canned spinach contains as many edible portions as seven carloads of the fresh product, one car of dehydrated spinach may contain as many "helpings" as a trainload of 25 refrigerated cars of the fresh vegetable. On the other side of the ledger, however, is the fact that most dehydrated vegetables produced up to this time have been inferior to fresh products in appearance, aroma, flavor, consistency, and food value.

Just the same, do not too greatly discount the future of dehydrated foods. New processes and equipment are now available to produce, at very low costs, dry vegetables and fruits fully equal in all essential qualities to the best fresh or frozen products.

What, in view of the foregoing facts, is the future of frozen foods? Very bright indeed—if quality is constantly improved, costs are continuously lowered, and better and broader education of all elements of the industry is wisely planned and aggressively carried on.

Improving Frozen Foods

In considering the quality of frozen foods, it must be remembered that "quick freezing" consists not merely of freezing foods but of a whole series of events extending from raw material to cooked product. The only time the

quality of frozen foods really counts is when they pass between the lips of the ultimate consumer. Permit me, therefore, to deal specifically with a few of the many steps which must be carried out more efficiently if the quality of frozen foods is to be greatly improved.

Better varieties of vegetables must be developed. In that way, and by improved horticultural methods, the raw material can be substantially increased in quality. The time between the harvesting and the blanching of the vegetables must be cut down. In many instances steps must be taken to chill the product immediately after harvesting and to keep it at near-freezing temperatures until processing is started. Blanching methods and apparatus must be improved, for much of the vitamin and mineral content of the best vegetables are now lost in the blanching process. Better packages must be used to eliminate freezer burn and oxidation during storage.

Sanitary handling is, of course, essential. Yet, from a microbiological viewpoint, very few perishable food plants are even fairly clean. If a processing plant has a sour or other unpleasant odor, it cannot be clean. Sanitation is especially important in the case of frozen cooked foods, many of which are excellent media for bacterial multiplication. These cooked foods are not sterilized during preparation and bacterial growth may take place to an alarming extent during the cooling period after cooking.

Numerous new producers and distributors, many of whom know nothing about quality and care less, have been induced by a prolonged seller's market to enter the frozen food field. The number of producers alone has increased from approximately 450 to well over 700 in the last 12 months. The sooner a large proportion of these marginal producers and distributors fall by the wayside, the better it will be for the industry.

Transportation facilities for frozen foods are today woefully inadequate. Research work is now being carried on by several associations interested in low-temperature transportation, and we may confidently expect that before long transportation hazards will be largely eliminated.

Improper handling in retail stores causes a great deal of damage to frozen foods. Many chain stores, as well as individual retailers, have wilfully exposed frozen foods to thawing temperatures of the edges of, and on the floor around, their low-temperature dispensing cabinets and have then refrozen the product by placing it in the cabinets overnight. Chain store executives and individual store managers are fully aware of this practice, but condone it for expediency's sake. Retailing abuses such as this must be eliminated before frozen foods can come into their own.

Present costs of frozen foods are too high and must be reduced if these products are to come within the reach of the lower income groups. To that end, large-scale automatic production must be en-

couraged. Moreover, distribution costs—the spread between the producer and ultimate purchaser—must be cut.

A wisely-planned and aggressive educational program must be beamed not only at the consumer of frozen foods but at every factor in their production and distribution. Industry-education is just as important as sales promotion.

Quick freezing and other improved methods of preserving foods have shown us how to make perishable foods imperishable and to eliminate time and space except as purely economic factors. Inevitably, these newer methods will improve the diet of the average American and will have important sociological and political effects. They make it possible to harvest or grow even the most delicate perishable foods anywhere in the world

where they can be produced most advantageously and to consume them in substantially fresh condition months later and at distant points.

Thus farmers in the populous industrial eastern states will be brought into even more direct competition with the vast new low-cost agricultural areas of the West; the fisheries of New England will have to compete with products produced by floating factories in the South Pacific and Arctic oceans; and New England dairy farmers may well have to fight central and even far western states for the Boston market. Obviously politics cannot be kept out of such a situation.

But, whatever happens, it is certain that frozen foods will increasingly contribute to the health and happiness of the American people.



—USDA photo by Knell
War-time nutrition-in-industry program has suffered in postwar era.

The Industrial Nutrition Program in the United States

By Dr. Robert S. Goodhart

Scientific Director, National Vitamin Foundation, Inc.

THE FEDERAL wartime nutrition program for industrial workers resulted from recommendations made by The National Nutrition Conference for Defense, called by President Roosevelt and held in Washington, D. C., May, 1941. It was based upon the recognition of the importance of proper food in maintaining the health and the productive capacity of the workers.

During the war this program operated through a staff of special-

ists in the War Food Administration in Washington and in regional offices. It functioned by furnishing advice and assistance to industry, labor groups and state and voluntary agencies. Its funds and staff were always kept small and the success of the program depended to a major extent on the ability of the Federal workers to stimulate and advise state and local agencies. The greatest advances were observed in those states where the health or labor departments

took an active interest in developing state programs.

The combined efforts of all the agencies concerned were gratifyingly successful in protecting the nutritional status of the American people, including the worker, during the war. The consensus of nutrition and health authorities is that the general health and nutritional status of the American people probably improved during the war, despite shortages of food, housing and medical care and an increase in working hours, congestion and other factors that adversely affect living conditions. However, the fact that the nutritional quality of the American diet was reasonably well maintained during the war affords no grounds for complacency. Nutritional deficiencies are prevalent in the United States, and there is a marked difference between that state of nutrition just sufficient to prevent the development of obvious deficiency diseases and the state of optimum nutrition.

It has been shown that, in addition to its role in the production of specific deficiency diseases, the nutrient content of the diet has a profound effect on growth, on learning ability, on the capacity for physical work, on resistance to infections, on the efficiency of pregnancy and parturition, on the ability of the mother to nurse her children and on longevity.

As Dr. Thomas Parran, Surgeon General, United States Public Health Service, has said, "The newer knowledge of nutrition and its relation to human health—one

of the greatest scientific miracles of our time—has taught what is required to nourish the human body. Thus it is possible to eradicate many diseases directly caused by a deficiency in diet, to reduce infant and maternal mortality, to prolong the active productive span of life, and to attain a higher level of physical and mental health."

Workers' Nutrition Activities Cut

In spite of these facts and their general recognition, the U. S. Department of Agriculture saw fit to markedly curtail the nutrition activities formerly carried on by the War Food Administration, as soon as possible after the termination of hostilities.

I am happy to be able to record the establishment of a section of Nutrition Services within the States' Relations Division of the United States Public Health Service. This section has undertaken an ambitious program designed to enable the individual state health departments to assess the incidence and importance of malnutrition in their areas of jurisdiction and to advise the states on the institution and conduct of remedial measures. I wish you to note particularly that all of the Federal nutrition programs referred to by me are obviously predicated upon the individual states assuming the final responsibility for the health and welfare of their own people.

Unfortunately the United States Public Health Service does not presently contemplate assuming the responsibilities and functions of

the Industrial Nutrition program conducted by the War Food Administration and the U. S. Department of Agriculture. I say unfortunately, because the Department of Agriculture has reduced the funds and personnel of its Industrial Feeding Division to an extent where field assistance to the states is no longer possible. The staff consists of eight or nine persons, including secretaries, in the Washington office who are kept busy, as you can well imagine, giving what assistance they can through the publication of technical and educational materials and replies to correspondence. They have also undertaken to hold workshops in various states as often as they can manage to do so. I understand that two have been successfully conducted this fall, one, I believe, in North Carolina and one in Kentucky or Tennessee.

The Industrial Feeding Division is doing as much as can be hoped for, under its circumstances, but, obviously, it cannot be counted upon to give close attention to and detailed assistance with problems in any one state. This is a situation where the State, New York State, must assume aggressive leadership in tackling the nutrition problems of its workers.

Aspects of Industrial Nutrition

Health authorities recognize industrial workers as belonging to one of the vulnerable groups. That is, they, like pregnant and nursing women, and children, are extraordinarily vulnerable to many factors potentially dangerous to health.

This is so because of their generally low and frequently marginal economic status, their general urbanization, the low average level of education, poor housing and unfavorable social environment, periodic employment, poor food habits and the strong tendency to observe traditional food patterns, and other causes of less general applicability. Their health must be the concern of the State and of all of us, if for no other reason, simply because upon their productivity depends the health and happiness of all of us and because invalidism among them is a major burden upon the State. A requisite for good health is good nutrition.

The proper feeding of industrial workers is a complicated problem, the solution of which requires the cooperation of industry, labor, the community and the Government. There are the problems of provision of foodstuffs; of the distribution, preparation and service of foods; of food habits; of adequate housing, transportation, shopping and feeding facilities, and there is the problem of the relation of cost to purchasing power.

Education must play a role of prime importance. To be successful, however, appropriate educational activities must be directed not only to the consumer but also to all groups concerned with the production, distribution, preparation and service of foodstuffs. Educational procedures must be based upon sound information concerning the practical difficulties apt to be encountered and must be adapted to the situations with

which they are intended to deal. The need for an intensely practical approach to the nutrition problem is perhaps nowhere more apparent than in industrial and other mass feeding situations.

To adequately provide for the

nutritional requirements of industrial workers is not an easy task, but the benefits to be derived by the people of the State from an effective industrial nutrition program fully justify the undertaking.

Labor's Viewpoint on Nutrition

By Miss Fannia M. Cohn

Secretary, Education Department, International Ladies' Garment Workers' Union

"We do not lack the means of producing food in abundance and variety. Our task is to translate this abundance into reality for every American family."

ACROSS section of the country responded to this challenging summons of President Roosevelt by attending the National Nutritional Conference for Defense in Washington in 1939, to which I had the privilege of being invited.

Among other things, I learned from discussions of scientists there, that if everyone in America had an adequate diet, 10 years could be added to our active life's span. The advances in our knowledge of nutrition have made it clear that the food an individual eats fundamentally affects his health, strength, demeanor, nervous condition, also moral and mental functioning.

It was shown at that Conference that if one-third of our Nation who were undernourished would consume better and more food, 40,000,000 additional acres of farm land would have to be devoted to food production and food expenditures would increase about two billion dollars annually.

What inadequate nutrition can mean to a nation was forcibly demonstrated by the fact that more than one-third of a million men examined under the Selective Service Act were found to be unfit for general military service and of those rejections more than one-third were due directly or indi-



—USDA photo by Knell
Between meal snacks help health
of workers.

rectly to nutritional deficiencies.

It is a painful commentary on our understanding of food values when the farmer, they who feed the world, frequently are vitamin starved themselves.

Believing merely in the necessity of informing people of the importance of proper nutrition in sporadic campaigns will not do the job.

What is necessary is a carefully planned, effective simple nutrition program to be conducted for housewives, in public school buildings or in other community centers. Motion pictures, the radio, and the public press should be effectively utilized to make the community "nutrition conscious." The ap-

proach and method of this program should be interesting, suggestive, and the language plain and free from scientific terms.

The problem of a healthy balanced diet must be approached as an economic as well as an educational problem. The efforts to make our people nutrition conscious must not overlook the need for defining what the minimum income of a family must be to meet the requirements of health and comfort in our industrial civilization.

We should not, however, overlook the fact that food to a human being has another meaning than to an animal. Just as we have preferences in art and esthetics, so do we have our preference in food that is appetizing. This frequently varies with each individual. The worker is impatient with those who advise him how to get all the "vitamins" on a low budget. The worker and his family want to enjoy his food as others do. He wants his daily meals to be one of the pleasures of life.

Nutrition Part of Bigger Problem

The problem of food, therefore, cannot be divorced from the social and economic context. We must not overlook the fact that the best food, though it contains most of the important vitamins and other essential elements, will hardly produce the expected results when served in slums, in unsanitary, unattractive surroundings.

We have a right to expect that the community, the state and the Nation will appreciate that the concern about a balanced diet is after

all a question of health, and will, therefore, identify the importance of having comfortable, attractive homes for every citizen. A good home, it is recognized, by every thinking man and woman, also is the best safeguard against child delinquency.

Another important element should be considered in connection with nutrition. The time allowed for luncheon. The congestion in the restaurant, the rush to get rid of the customer, the noise made by the personnel in calling out the orders, deserves much consideration.

We know that eating means more than merely consuming food. The relaxation, the surroundings are essential "supporting" elements of a balanced diet.

Suggested Program

May I make the following proposals:

(A) That free luncheons in the schools should be provided for all the children (including the high school pupils) of the Nation regardless of family income. This is necessary, I think, to safeguard the children of the lower income groups from embarrassment. The health and vigor of our children, which are the greatest assets of a nation, should be as much a concern of the community, state and nation, as free public education, therefore, free lunches should become a part of our free public school system.

(B) There should be elasticity in ingredients to meet the taste of the children.

(C) Enriched bread should be available to all, whether it be in the restaurant or in the home.

(D) A central buying agency should be created by the city to provide for the school luncheons. It certainly will be a better efficient method of providing food, and a saving in the budget, than by having every school do it separately. The principal may be a perfect educator and administrator, but prove to be a very poor business man.

The organized labor movement is extremely concerned with the economic, social, cultural and health conditions of the workers. It is its main function, continuously, to improve the well being of its members that will make it possible for them to be active

participants in the life of the community and the Nation.

Our country leads the world in technological development. Now when our civilization is going through the greatest crisis in the history of mankind it is up to us to lead the world in social technique—that our people may enjoy freedom from want, security against unemployment, that is so essential to the healthy balanced diet, and also most essential to a healthy democracy.

We, therefore, appreciate the efforts of the New York State Joint Legislative Committee in enlightening the people of this State on the importance of nutrition. In this effort the labor movement and workers' education will gladly join with other social and educational agencies of the Nation.

Nutrition From a Social Agency's Viewpoint

By Stanley P. Davies

General Director, Community Service Society of New York

THE COMMUNITY SERVICE SOCIETY was formed in 1939 by the merger of two of the oldest social services in the country—the AICP and CSS. This organization will celebrate its one hundredth anniversary in 1948. To define the function of this Society in four short words, it is simply a family and health agency. It is dedicated to safeguarding and strengthening family life and improving conditions of living for all in our city. The unique importance of the family in preparing the individual for social living is well-known, and it is increasingly imperative that the knowledge essential for making good homes and thus good human beings be within reach of all. And because emotionally healthy homes cannot flourish where physical and economic health are absent, our service must and does take account of these factors in helping citizens to build a more healthy community for all.

It is to help promote better physical health that the Society, among its various activities, maintains a Nutrition Service, with nine trained nutritionists on its staff.

Good health is important to everyone. For the wage earner it is of vital concern, for a day's absence from sickness usually means a loss of a day's pay. Families on marginal incomes, just able

to get along when every pay check comes in regularly, see their financial structure topple when this happens. If the cost of doctor's bills, medicine and hospital care are also incurred, the deprivation becomes even greater.

The health of the mother in the family has a great influence on the well-being of her whole family. If she is sick, the home may become disorganized, meals sketchy and poorly prepared, irritability and emotional instability increased.

The health of children, who are our hope for the future, is of equal importance. Children grow only once, and if they are not properly provided for during the growing

Avoid Fatigue



period, it will be too late. Dr. Henry C. Sherman, of Columbia University, with whom our agency has at various times in the past cooperated on nutritional research, says that "nutrition cannot always cure what it most certainly could have prevented. Every nutrition program may well stress the importance of building good food habits in all children. The returns throughout life would be almost beyond our belief."

Low Income Groups Suffer

Dr. Frank Boudreau, a member of our C.S.S. Board, and well known to all of you interested in good nutrition, has said that "The low income groups in this country suffer disproportionately from sickness, and have generally unfavorable death rates. Infant mortality and tuberculosis death rates furnish strong evidence of the disadvantage under which they suffer. Bringing the diets of these groups more nearly up to full requirements will at a stroke wipe out their principal disadvantages."

Concrete evidence of this "disproportionate" amount of illness in low-income families was disclosed in a comprehensive health study made by the government in 1935. Compared with families of moderate or higher incomes, families on relief had 57 per cent more illnesses disabling for a week or longer, and families with incomes just above the relief level had 17 per cent more. Also, the duration of illness was 63 per cent longer in the first group, and 20 per cent longer in the second.

In 1929, long before the word "billion" was part of our common vocabulary regarding expenditures, the people of the United States spent 3½ billion dollars on medical care—500 million dollars of which went for tax-supported work. We believe much of this might have been saved by better preventive practices, to say nothing of the sickness and heartache that might have been spared. But in any event, we need more prevention of illness, and the evidence at hand has shown that the principles of good nutrition, regularly followed, offer one of the most important preventive methods available.

Dr. Lydia Roberts, formerly of the University of Chicago, has said that "To realize fully our hopes for a healthy citizenry, people must know what it means to them in terms of personal health and vigor so that they will voluntarily eat regularly foods that will meet their needs. This can be accomplished only through an effective education program among all ages and classes of people."

CSS Nutrition Service

Our Nutrition Service, to the utmost of its capacity, helps to carry on this educational program. Nutrition education would be a simple task if it could be accomplished by merely acquainting people with the Seven Basic Foods. Unfortunately, the procedure cannot be done so easily, for there are many factors that mitigate against families accepting a general pattern of food selection and meal plans. Nor would we want them all to use the

same plan. We all have our personal preferences about most incidents in our daily lives, and certainly in selecting our meals, which we do three times a day, 365 days a year. Throughout our whole life span, we want to indulge our personal likes and dislikes, and we want our families to indulge theirs, too. But we want good nutrition *plus* our own preferences, and the two are compatible when we know the facts. Personal preferences are the first consideration as our nutritionists work with families, but in every family food pattern, no matter how inadequate it may be, there are some good points and these the nutritionists build on, suggesting changes in emphasis, and additions here and there until good nutrition is achieved.

The skill of the homemaker in preparing meals and planning her household routine to include time for shopping for foods is another factor to be considered. Unfortunately, many of our young people come out of school poorly prepared to carry on the everyday tasks of the home. This is a subject that could well be furthered in all our school systems.

Still another factor is the equipment available for meal preparation. Many of our families have no refrigeration to care for foods, and must buy foods on a day to day basis. Some have no ovens, and many baked dishes that would add to the appetite appeal of a meal must be omitted. Even such basic equipment as pots and pans large enough for the family's needs, and enough dishes to serve the meals properly, may be lacking.

I could go on with many more of these points, which may seem extraneous, but which are important considerations as our staff members guide families to better practices in food selection and meal planning. Because the problems are individual matters, a large part of our nutrition education is done on an individual basis. That this method works, the agency has proved many years ago, in two studies it made. The results of the first study, in 1914—and this shows how far back the agency's interest in nutrition education goes—were published in a pamphlet entitled "The Adequacy and Economy of Some City Dietaries"—and far too many were found inadequate. The second study, made in 1928, compared the food habits of some of these families with others who had had no previous nutrition education. Even after a lapse of 14 years, the first group had better food habits in every respect, yet spent less money to achieve them. These results were published in the pamphlet "Influence of Education on the Food Habits of Some New York City Families."

Nutrition of Children

Because building good food habits in children is so important, we are happy when we can reach families when their children are small. It is an interesting and gratifying fact that the families our nutritionists reach average almost six members per family compared with an average of 3.7 for the agency as a whole, so it is evident that our nutrition education is more or less concentrated on the children.

And good nutrition for children goes farther back than this—back to the prenatal period, as has been proved by studies in Boston, Toronto, and elsewhere. And sad it is that we must say “elsewhere” and not be able to say “here in New York,” but this has been a too neglected program in this city. Our staff, together with the Department of Health and the Bronx Nutrition Committee, are now making plans for a demonstration in this field in one of the city hospitals. And it was encouraging to read a news item reporting the interest of the New York State Joint Legislative Committee on Nutrition in promoting better maternal nutrition work throughout the State. We hope this will not fail in its fulfillment.

And children themselves need to be acquainted with simple food facts, good food selection and good meal plans, within their abilities to carry them out. Two of our nutritionists spend almost full time in some of our public and parochial schools, and through their work have given classroom talks to over 12,000 children in the past year, together with suggestions and help to the teachers so they can continue the program of good nutrition. Another 50,000 children have been reached through educational programs providing principals and teachers with nutrition material, booklets, exhibits.

There are many agencies in the city that have occasional need for nutrition service, and we have welcomed opportunities to work with them as the need arises. For several years we have given a consultation service to students at the Institute

for the Crippled and Disabled, since good nutrition is important to these handicapped people as they are helped to adjust themselves to the routines of daily living.

With the Children’s Welfare Federation we have cooperated in the preparation of a food guide for children’s camps, which has been widely used throughout the United States. For the Protestant Welfare Federation, we have helped plan better meals for the elderly people living in homes for the aged affiliated with their Federation.

For some of the universities in the city, we have offered field work training in our Nutrition Bureau, both for graduate and undergraduate students who wish to enter the field of nutrition and public health. The need for trained nutritionists is very great at present, with few qualified workers to fill existing vacancies, so we feel that this is an important contribution for us to make toward furthering a more widespread nutrition service.

Reaching the Masses

While we know the importance of individual work in nutrition education, we recognize that at best it reaches only a limited number of the people who need and want it. So we also employ other educational methods to reach a larger group of people, though in a more general way. The Bureau prepares nutrition leaflets which have had a wide circulation. The subjects cover foods for children of various ages, normal adults, those needing to gain or lose

weight, and others. Dinner menus for one week, with recipes, are prepared each month, emphasizing the foods that are seasonal and easily available. They are distributed free to families known to the agency, and are often purchased in quantity by other agencies for their use. "Nutrition Notes", a monthly leaflet giving timely and practical hints about food selection and preparation, is distributed free to all members of the C.S.S. staff, and sold on a subscription basis, going to nearly every state in the Union and to 13 foreign countries.

Through group talks when requested, radio talks, newspaper releases, and magazine articles, our staff has further spread information on nutrition to a wide but uncountable audience.

This gives only a brief picture of the variety and extent of the activities in our nutrition education program. Still, it reached directly only some 4,000 individuals, and even indirectly probably reached only a small portion of the 7,000,000 inhabitants of this city. Yet it is the kind of information needed by everyone, for poor nutrition and deficient diets are not confined to the low-income group. If a program

of nutrition education to reach everyone is to be provided, our city, State and Federal agencies must in the future play an even greater part in it than they are doing at present. We hope that what we have shown of the Nutrition Service in our agency will emphasize the value of it to the individual family and to the community at large. We hope, also, that it will serve as one means of urging the Joint Legislative Committee on Nutrition to do all within its power to extend nutrition education by increased State appropriations for this purpose. And to further emphasize the need, let me close with another statement from Dr. Boudreau: "The best way to begin the campaign to raise the standard of living of the masses is to apply as rapidly as possible the newer knowledge of nutrition which has unfolded so rapidly during the past quarter of a century. A soundly conceived program for the promotion of nutrition among the people in any country will have many favorable repercussions on that country's economy and stability. . . . It will reduce sickness and death rates among the people, promote abounding health and extend the length of life.

The A.M.A. Viewpoint on Nutrition

By Dr. James R. Wilson

Secretary, Council on Foods and Nutrition, The American Medical Association

SCIENTIFIC research in the field of foods and nutrition has one prime purpose—the improvement of health and nutrition. Research is meaningless to the public unless applied, for to know what is good for us is of little profit unless the knowledge is used.

We agree with Disraeli when he said, "The health of the people is really the foundation upon which all our happiness and all our powers as a state depend." Therefore, we believe that as a people we cannot afford to neglect our nutritional needs. Advances in the science of foods and nutrition during the war are worth little unless translated in terms of good food in the stomachs of those who need it. Although New York State does not present the dramatic picture of blight due to malnutrition such as is found in parts of Newfoundland

and parts of our own mountain districts, the condition exists and insidiously infiltrates and weakens the community without the general awareness of those who are well fed.

A nutrition program must be prosecuted with vigor if we are to shorten the wide gap between scientific knowledge and its application to human needs. Neither can the splendid results of research in nutrition be disregarded nor can new researches be abandoned. These things are the concern of the Council on Foods and Nutrition of the American Medical Association. The council, while not a research body itself, recognizes the need for research and is always interested in stimulating scientific investigation. The council regards as vital the prosecution of a strong nutrition program.

The Public Health Service and Nutrition

By Dr. Harold R. Sandstead and Dr. Floyd S. Daft
U. S. Public Health Service

DURING the past 30 years there has been a growing realization that nutrition constitutes an important public health problem in the United States. In these three decades, noteworthy advances have been made in the science of nutrition, both in the experimental laboratory and in the clinic. These advances in knowledge plus the growing facilities of the U. S. Public Health Service have now made it possible to undertake a large scale study, designed to explore and to some extent define the nutritional status of our population as a whole.

Health Service Hits Pellagra

The early history of the public health aspects of nutritional deficiencies in the United States is largely a story of one disease—pellagra. Although first discovered in Spain in 1735, pellagra was not generally recognized in this country until 1907. Within a few years thereafter it became apparent that the condition was extremely widespread in the southern United States, and by 1916 pellagra was the recognized cause of death of over 4,000 persons yearly.

In 1914, Dr. Joseph Goldberger, a physician of the U. S. Public Health Service, was assigned to its study. At this time, opinions varied widely as to the etiology of the disease; the two most popular concepts were that it was of infectious origin and that it was caused by a



—USDA photo by Knell
School lunch builds healthier
Americans.

toxic factor present in spoiled corn. Within a few years, Dr. Goldberger and his colleagues showed quite conclusively that pellagra is a deficiency disease and did much to define the nature of the deficiencies involved. The main contributions of Goldberger and his co-workers were: (1) the demonstration that a faulty diet will cause pellagra, while a good diet will prevent or cure the disease; (2) the demonstration that pellagra cannot be transmitted from person to person, at least by ordinary methods; (3) the recognition that amino acid deficiencies were or might be involved; and (4) the discovery of the existence of a vitamin of the B complex, active in the prevention or treatment of the

disease. This vitamin was named the "pellagra-preventive (P-P) factor." Many studies were made by Goldberger and his associates of the distribution of the P-P factor in foods. Of great importance from a therapeutic standpoint was the demonstration that dried yeast is rich in this vitamin. The identification of niacin as the P-P factor and the elucidation of the tryptophane-niacin relationship did not come in Goldberger's lifetime, but his work laid a solid foundation for many of the later developments in the field.

Following the death of Goldberger in 1929, nutrition investigations in the Public Health Service were continued and expanded under the supervision of Dr. William H. Sebrell. The 15 years from 1914 to 1929 had witnessed a tremendous growth in our knowledge of nutrition and this change is reflected in subsequent investigations by workers in the Public Health Service.

Important contributions since 1929 have included: (1) the first recognition and description of riboflavin deficiency in man; (2) studies of experimental liver cirrhosis and the demonstration of the beneficial effect of choline in the therapy of this disease; and (3) studies of experimental blood dyscrasias, including those caused by a deficiency of pteroylglutamic acid ("folic acid"). Investigations along similar lines are at present in progress.

The participation of the U. S. Public Health Service in the application of nutritional information to the improvement of health has

also followed logically from the early studies of Goldberger. The years 1914 and 1915 are momentous to those who are engaged in control and prevention of nutritional deficiency disease. It was during this period that Goldberger and his associates demonstrated scientifically that the techniques for study of a common and serious nutritional deficiency disease (pellagra) could be applied with an approach similarly used in the study and prevention of communicable disease. They demonstrated that this disease was the result of a poor diet and could be prevented and satisfactorily treated by diets containing the "pellagra preventive" food factor. The medical profession was slow in accepting this truth. Since then we have seen how rickets, simple goiter, scurvy, and beri beri could be prevented similarly and effectively on a mass scale. And yet, today, owing to lack of application of our present knowledge, rickets and simple goiter, as well as other deficiency diseases, are common.

Public health officials are now concerned with nutritional deficiency diseases less severe in degree but very prevalent and which may result in ill health and increased susceptibility to infectious disease and which, if continued, may influence the metabolic process leading to cirrhosis of the liver and possibly other degenerative disease. More significant, however, is the acceptance by the public health and medical professions of the challenge to promote the highest possible level of nutrition in all levels of society.

Nutrition Conference

In the years immediately preceding the war, several carefully conducted nutrition surveys led the Food and Nutrition Board of the National Research Council to conclude that "deficiency states were rife in the Nation" and "dietary inadequacies common." It was recognized by specialists that these conditions might adversely affect industrial output and this information led to the convening of a National Nutrition Conference in May of 1941. At this conference it was recommended that diagnostic services in deficiency diseases be made available to health departments and physicians as soon as methods of proven value could be developed and that local and State health departments take a greater interest in nutrition.

In carrying out the recommendations of the Conference, the Surgeon General assigned a medical officer in June, 1942, to the Nutrition Division of the Office of Defense Health and Welfare Service to work as nutrition consultant for public health officials and the medical and dental professions. The objective was to stimulate further development of the public health and medical aspects of the national nutrition program. Soon after the Nutrition Division was transferred to the Nutrition Programs Branch of the War Food Administration, with a Medical Officer of the U. S. Public Health Service as Associate Chief. In time, several other Service officers were assigned to the Nutrition Programs Branch. Their function was to assist in the organization of

State nutrition committees, hold nutrition clinic demonstrations, and assist State and local health departments in organizing nutrition programs and to give consultation service to industry.

During the war, several officers of the Public Health Service were assigned as medical nutritionists to U.N.R.R.A. and to the War Department. In both assignments they saw service abroad, conducting nutrition surveys on civilian populations and displaced persons, and otherwise assisting the military and civil governments in estimating the kinds and quantities of foods required for feeding the populations.

Nutrition Problems

Today, as during the war, this nation is faced with the greatest and most complex problem in preventive medicine yet encountered. It is the problem of food and nutrition. The technical knowledge is available and there is some understanding of optimum nutrition but the application of this knowledge involves: (1) determination of the type, severity, and extent of deficiency diseases; (2) greater emphasis on recognition of deficiency states through training of the public health and medical professions; (3) changing food habits and food patterns; (4) education of the lay public to spend money wisely on food rather than self prescription of vitamin preparations; (5) economics; (6) agriculture; and (7) distribution. The health officer has found himself in the midst of this new field in preventive medicine.

A number of official and voluntary agencies have been working on certain aspects of these problems for years. The home economics and agriculture teachers in our high schools and colleges, the Agriculture Extension Service, the Red Cross, the Bureau of Human Nutrition of the Department of Agriculture, the Children's Bureau of the Federal Security Agency, and a number of other organizations have been on the nutrition firing line for a long time. Through grants-in-aid funds the Children's Bureau and the Public Health Service have assisted State health departments in establishing and maintaining specialized nutrition service on a State level. However, most of the emphasis has been placed on maternal and child hygiene with little attention given to the public at large. Health officials now have an added responsibility in the school lunch program, not only in the supervision of the sanitation of the school lunch rooms, but also in cooperating with school officials in bringing about conditions that will assure the maximum nutritive benefits to the child from the lunch.

On the recommendation of the Conference of the State and Territorial Health Officers that the Public Health Service further assist the states in developing nutrition programs, a Nutrition Section in the States Relations Division of the Bureau of State Services was organized in 1945. It had been felt for some time that the basic research activities should be complemented by a program to show how the results of these investiga-

tions could be applied as a part of public health practice.

The objectives of this program have been: (1) to test, develop, and apply methods which can be applied by health officers for assessing human nutrition; (2) to collect information on the prevalence of malnutrition; (3) to apply basic nutrition research to the field; (4) to collect information on the etiology and therapeutics of deficiency diseases particularly as it can be applied in the field; and (5) to conduct demonstration projects for training and educational purposes. More briefly stated, the purpose is to do field studies on the prevalence of nutritional deficiency disease from a medical public health standpoint and to test and develop remedial and preventive measures of practical value to public health organizations.

Mobile Field Units

Since this program began, mobile field units have been located in four geographic areas, viz., the Southeast, North Atlantic, North Central, and Mid-Atlantic area, and it is hoped that similar units may be located in each of the other sections of the country. Each unit is staffed with a medical officer, a public health nurse, a nutritionist, a biochemist, a laboratory technician, and a clerk.

Each field unit works intimately with the official health organization, generally a county health department with a strong generalized health service. The presence of a strong and interested school board, as well as an interested college or university and agricultural organ-

ization, greatly assists in carrying out the program.

The staff of the Central Office of the Nutrition Section, in addition to its function of general supervision and coordination of the nutrition programs in the field units, expects to develop a program of aid and consultation to State health departments and certain other agencies interested in nutrition. In fact, the basic purpose of the section, as a part of the States Relations Division, is to stimulate the further development of nutrition services within state and local health departments. Programs are being developed on a cooperative basis in a few states with the department of health, the medical school, and the U. S. Public Health Service participating.

Nutritional Surveys

In evaluating the nutritional status of a community or area, a representative sample is determined, taking into account economic and racial factors. All members of the family as a unit are invited to attend the clinic where a physical examination is made, a dietary record taken, and certain laboratory determinations made on finger tip blood. An important part of the work of the staff will be to appraise and analyze the procedures used in order to simplify appraisal methods for use by states. Since these field units will not remain in a locality indefinitely, efforts are being made to enable the state to continue this program. As the program develops, the health officer will be informed as to the type, prevalence,

severity, and locale of nutritional deficiencies within his state which will assist him in taking specific measures for their prevention and control.

Since the inauguration of this program, about 20,000 individuals have been appraised. Nutritional deficiencies of all types and severity have been diagnosed, and it may be concluded that deficiency diseases are common and that a large proportion of the population have inadequate or unbalanced dietaries.

It is believed that each state health department should actively engage in the medical and health aspects of nutrition. The eventual goal might be a division of nutrition headed by a public health physician who has been trained in nutrition. He should have on his staff a number of nutritionists and have access to a good nutrition laboratory headed by a biochemist in order that a complete nutrition appraisal may be made. Other services which this division could give include: (1) consultation to other divisions within the department, particularly the maternal and child health, industrial, tuberculosis, and local health administration divisions; (2) consultation to agencies responsible for the mental, penal, and other eleemosynary institutions; (3) preparation and distribution of educational material for both lay and professional groups; (4) consultation to the welfare and educational departments, particularly on the school lunch program; (5) assistance in sponsoring conferences and refresher courses in nutrition for

public health and educational groups; (6) active participation in public health clinics; (7) cooperation with and assistance to agricultural and food distributing groups in locating and meeting food problems; and (8) carrying on a program of laboratory, clinical, and educational research in the field of nutrition.

Many, perhaps most, state departments are as yet unable to inaugurate such a division or program, and those who are interested in such developments still have a long way to go in presenting a thoroughly practical public health program in nutrition for health departments. We are convinced, however, that this should be the eventual goal and that there is already enough background and experience for a beginning to be made. As in other fields of preventive medicine, the Public Health Service will continue to

team up with state and local health departments and the medical profession in developing and carrying out, in cooperation with agricultural and educational groups, a national nutrition program.

In addition to the fundamental research in nutrition carried on at the National Institute of Health and the exploration of the nutritional status of the population conducted by the Division of States Relations of the Public Health Service, research in the field of nutrition throughout the United States and its territories is being stimulated by a system of Public Health Service research grants. This is a part of the larger program of grants-in-aid for research in the medical sciences which is administered by the Research Grants Division of the National Institute of Health. To date, a total of 30 grants for research in nutrition have been approved.



—USDA photo by Forsythe

There's plenty of reason to smile when you're getting a balanced meal.

Nutrition in the State Health Program

By Dr. Edward R. Schlesinger

Acting Director, Division of Maternity, Infancy, and Child Hygiene, New York State Health Department

IN THE STUDY of human nutrition there is such a complex of factors that it is often very difficult and sometimes impossible to separate those factors which relate to nutrition itself from other factors such as housing, clothing and various other indices of economic status which tend to fluctuate in the same direction as nutrition. Enough is known, however, to indicate that the nutritional status of the individual and the group is definitely reflected in terms of health and disease.

It is further known that disease in its turn may result in a nutri-

tional deficiency or aggravate one already present. This latter relationship is most clearly brought out notably as a result of investigations on the cause and treatment of cirrhosis of the liver. The absence of certain vital food factors in the diet over a period of years produce fatty and degenerative changes in the liver. Partly as a result of these changes, the already impaired appetite of the patient falls off even more, making the nutritional deficiency worse. Finally, irreversible damage occurs in the liver as a result of extensive scarring and death follows. This

vicious circle can be *broken* if the necessary food factors are supplied in a carefully selected diet before the irreversible changes have occurred in the liver.

The science of nutrition, then, is an inseparable part of the contemporary medicine. This rapidly accumulating body of nutrition knowledge must be applied for the benefit of the people of the State as an integral part of its public health program.

In turn, the direction and development of the total public health program determine the shape and extent of the nutrition program. This two-way interplay is not spectacular; but it will, in the long run, insure that the roots of nutrition knowledge will penetrate deeply into the matrix of the people's dietary habits—beyond the vagaries of transient enthusiasms in the nutrition field.

Early Studies

Traditionally, nutrition invaded the public health program through maternal and child health, and understandably so. The most obvious need for nutrition education lay in the teaching of good family nutrition, with chief emphasis upon nutrition during the parental period and during infancy and childhood. The fuller significance of these early efforts has been brought out only in the past decade when controlled studies demonstrated the relationship between adequate nutrition before and during pregnancy and complications of pregnancy. Maternal nutrition has also been shown to

influence the condition of the offspring—and proper diet during the early years of life is known to have a pronounced effect upon the growth and development of the child. There need then be no apology for those pioneer efforts. Rather should we look to them in gratitude for having demonstrated some of the possibilities inherent in nutrition education.

For the future, although there must be an *absolute* increase in efforts devoted to the nutrition of mother and child, the *relative* importance of this field will diminish. This seeming paradox follows from the breathtaking developments in fields of nutrition unrelated to maternal and child health.

Let me reiterate this: there will be increased attention paid to nutrition during pregnancy and childhood but, at the same time, there must be a broadening of interests so that nutrition may take its place as an integral part of the entire public health program. With this clearly in mind, the changing emphasis in the public health nutrition program can be seen in proper perspective.

State Health Dept.'s Program

The nutrition program of the New York State Department of Health was started in 1922 when a nutritionist joined the department as part of the maternal and child health program. This nutritionist struggled on alone until 1936, when two more nutritionists joined the staff. Since then, additional nutritionists have been added until the present staff of five nutritionists was reached. Administratively the

nutrition services of the department are still one of the functions of the Division of Maternal and Child Health.

For a state the size of New York it was physically impossible for this small staff to do more than scratch the surface of the problems involved. Accordingly the nutrition services of the department are being expanded and reorganized. This is being done at a time when the entire department is undergoing a major reorganization so that the opportunity has been afforded to review the entire program and to integrate it into other activities of the department.

The plan now up for consideration has two major facets: On the one hand new specialist services in nutrition in the central office of the department and on the other, increased field consultation services through the proposed regional offices. In the central office, there would be, in addition to the administrative head of nutrition services, two highly qualified nutritionists in the special fields of nutrition education and group dietetics. The former would be expected to develop methods for applying latest developments in the science of nutrition to the public health program and she would also be in charge of in-service training of other nutritionists. The specialist in group dietetics would develop standards and methods used in handling food problems of institutions such as hospitals and convalescent homes, as well as in camps.

For the field services, a consultant would be assigned to each of

the five regions of the State to promote nutrition services in those regions and to provide consultation service to personnel of local health departments and to non-governmental agencies interested in nutrition. It is not to be expected that these field consultants give direct services to individuals either in clinics or in their homes.

Trend in Cities and Counties

Even in the matter of consultation in nutrition, the field staff as presented would be grossly inadequate if it were not for another development now taking place. This is the trend toward the establishment of full-time health departments in the counties and cities of the State. It is probable that a number of these local health units would establish public health nutritionist positions if there were a good possibility of finding qualified personnel to fill the positions. Undoubtedly a public health nutritionist would play a vital role in each one of the local health units. As a matter of fact, nutritionists with a good academic background are available but these nutritionists have not had an opportunity to acquire public health experience under supervision. It is to fill this gap that a program for training nutritionists is being planned to limit the possibilities for supervision within the department. The State Department of Health thus assumes a basic responsibility for providing experienced nutritionists for local health units. At the same time, working relationships have already been established. Periods of limited field experience for un-

dergraduate and graduate students in nutrition are being offered so that the student nutritionist may have an opportunity of deciding from actual experience whether or not she would be interested in the public health field.

Additional nutritionists would be available within the State Department of Health itself for special assignments, such as participation in studies designed to evaluate the nutritional status of the population of the State. It is also planned to assign State nutritionists to local health units for limited period of time in order to demonstrate the value of nutrition services and so promote the inclusion of nutritionists among personnel employed by local health units.

Only the broad outlines of the projected nutrition program have been covered in this discussion. Little or no consideration has been given to such important matters as the relationship of public health nutritionists to other governmental agencies and to voluntary agencies interested in the field of nutrition, to the place of nutrition in the various department programs, and the role of a committee composed of individuals prominent in the nutrition field to advise the department in regard to its nutrition program. Another department project, the dental caries fluorine demonstration in Newburgh and Kingston, now in its third year, has been reported previously before the Commission.

It is clear that the twofold increase in personnel for the nutrition services of the New York State

Department of Health would result in far more than a twofold increase in the services themselves. Nevertheless several obvious deficiencies are apparent in the proposed program even before it is ready to go into effect. Of major importance are the limited possibilities for basic research in nutrition. To overcome this deficiency it would be necessary to have a medical director who would devote his whole time to the nutrition field. More complete facilities for laboratory work in nutrition would be necessary. Along with this a clinic for the study of nutritional disorders would be essential. It is also quite likely that a nutritionist specializing in the dietary treatment of disease would be needed on the staff in central office within a year or two. Requests to fill these deficiencies have not been made because of the desire of the department to digest thoroughly the program already outlined to you.

Much has been heard recently of the attainment of so-called buoyant health, a state of being which is contrasted with mere absence of disease. This is undoubtedly a worthy objective—and one on which the public health nutrition program may well set its sights. On the other hand, in the search for this goal, the patent needs of specific groups of the population must not be overlooked. Indeed the modern knowledge of nutrition must be applied in all phases of care, for the ill as well as the presumably healthy, if this goal is to be attained at all.

Pennsylvania's Nutrition Program

By Miss Anna dePlanter Bowes

Chief, Nutrition Division, Pennsylvania Health Department

THE HEALTH of the ten million citizens of Pennsylvania is the immediate and long range concern of the Pennsylvania Department of Health. Extending the known benefits of good nutrition to a larger number of our people is one of the major goals of the Nutrition Division. In this endeavor, much assistance is continually being received from many affiliated agencies and individuals.

The Division's program is based on current, felt and expressed needs, particularly those indicated by public health nurses and physicians. It also includes the advantageous use of the findings of a large number of research studies. Those in Pennsylvania that have contributed specific data are:

1. The Pennsylvania Mass Studies in Human Nutrition conducted by Pauline Bery Mack, Ph.D. and associates^{1, 2, 3, 4, 5, 6, 7, 8} carried out by The Pennsylvania State College, the Ellen H. Richards Institute at The Pennsylvania State College, and the Department of Health. These studies have been continuous since 1935. They have given extensive data on the nutritional status of approximately 15,000 people of many nationalities and racial groups, at all ages, and at a variety of socio-economic levels.

2. The research by Winslow T. Tompkins, M.D.⁹ to evaluate by clinical observations, the importance of adequate nutrition in pregnancy and to determine the

possibility of a relationship between nutrition deficiencies and the complications of pregnancy. Dr. Tompkins' studies were started in 1935 at the Philadelphia Lying-In Hospital. They were interrupted during the war years but have again been resumed. The last report¹⁰ gives data on 2,000 expectant mothers.

3. The research on Congenital Malformations by Douglas P. Murphy, M.D.¹¹ and on the Food Habits of 1,500 Mothers of Congenitally Malformed Children by Murphy and Bowes.¹²

4. The Nutrition Study in Pregnancy carried on by Philip F. Williams, M.D., and Florence G. Fralin¹³ with 514 expectant mothers representing several population, economic, racial and nationality groups.

5. The dietary studies carried out by the author^{14, 15} in cooperation with many faculty members at The Thomas W. Evans Institute, University of Pennsylvania Dental School, and with private dentists in Philadelphia for 538 people of all ages and various socio-economic groups.

6. The examinations of Pennsylvania's 2,500,000 school children now in progress as a result of the School Health Act of 1945. This act makes complete physical and dental examinations compulsory for all children while they are members of grades 1, 3, 5, 7, 9 and 11. Teachers and other school em-

ployees also are required to have regular examinations.

These projects have shown:

- a) Serious dietary deficiencies in the food selections of pregnant women
- b) Poor food habits and gross dietary inadequacies among preschool children, those of school age and their parents
- c) A high degree of malnutrition among all groups of our population
- d) Extensive dietary inadequacies in the meals selected by children and adults who had rampant dental caries or serious dental disease
- e) Marked improvement in physical well being and nu-

tritional status when specific measures were instituted to improve health

In addition to these particular studies which have specific local interest and value, nutrition research in America and other countries is continually being evaluated for its applications to health problems in our Commonwealth.

The skillful use and adaptation by nutritionists of selected, pertinent facts and figures through charts, slides or movies vitalize individual or group teaching. Such data are the nutritionist's proof that dietary deficiencies exist. And reports of methods that give successful or negative improvement can be effective stimuli to constructive action.



—Pa. Health Department Photo
Pennsylvania Nutrition Program seeks to reach all mothers.

Getting Nutrition Facts to the People

During the war years, channels of nutrition education suggested by the National Nutrition Program were used. The Pennsylvania Nutrition Council, The State Council of Defense and the American Red Cross through their various projects, committees or chapters at the state and county levels were the agencies with which regular work was done. Each member of the Division of Nutrition was a continual participant in, and contributor to, working projects and publications of these various groups at the state and local levels. This cooperation has continued with the agencies that are still active. While rationing, food shortages, gardening and food preservation were specific topics under daily discussion, interpretations were correlated with the findings of the various Pennsylvania studies mentioned.

The fact that 49 to 74 per cent of the Pennsylvania diets studied have been found to be deficient in CALCIUM makes it seem doubly important to emphasize the foods high in calcium that can be purchased or grown in home gardens.

By the same token, the value of soybean protein is more ardently stressed because over half of the diets analyzed are known to be low in PROTEIN. Food demonstrations have been carried out using soybeans, fresh and dried, soy sprouts and soya grits. Thousands of copies of "Sing a Song of Soybeans!" have been distributed and used in every county.

Concern about 48 to 88 per cent of the diets being low in IRON as well as in protein, prompted the publication of a leaflet, "Attention! All Red-Blooded Citizens! (All Would-Be Red-Blooded Citizens, Too.)"

This outlines important food considerations to combat anemia for specific vulnerable groups in our population such as expectant mothers, infants, growing children, adolescents, industrial workers and people over 50 years of age. It also suggests steps to aid in rapid regeneration of hemoglobin for Red Cross donors who had heeded the war request of "Brother, Can You Spare a Pint?"

The press, the radio, movies and exhibits were other media used in correlating known facts about nutritional fitness and the scarce or the abundant foods of the week or the month.

At every meeting for lay or professional groups, small exhibits are set up to give the audience a quick interpretation of pertinent food facts or situations. Two editions of a bulletin on NUTRITION EXHIBITS were prepared for national distribution to all county nutrition committees throughout the United States by the Programs Branch of the War Food Administration. NUTRITION EXHIBITS is now in its 4th edition. Its present suggestions fit 1947 programs.

Up-to-Date Facts on Food Values

Early in the war a set of Food Value Charts (8 in a set) entitled

"VEGETABLES FOR VICTORY" was printed for quickly depicting the major contributions of vegetables to an adequate diet. Five other sets of charts (12 in each set) have been made available through the cooperation of the Philadelphia Child Health Society for state and national distribution. These charts¹⁶ show the comparative contributions various inexpensive and easily available foods make to protein, the most important minerals, and vitamins. These are so worked out that they can be used at prenatal clinics or conferences, child health centers, orthopedic diagnostic clinics, in schools, at tuberculosis clinics and for industrial groups.

Other aids to the dissemination of up-to-date facts are to be found in carefully compiled tables¹⁷ which list at a glance the values of a given food as served at the table or as purchased by the pound at market. Frequent revisions of these tables and their wide use in universities, colleges and schools by a variety of professional workers and by all members of the Division of Nutrition, tend to unify food facts given by various workers. Providing such basic materials for all staff members also facilitates easily comparable calculations of diets on a uniform basis in different counties. This is important in a state as large as Pennsylvania where nutritionists carry on the broad program of the Division in a given geographical area of counties without the benefit and help of the weekly staff conferences that are possible in smaller states.

Adjusting Programs to Present Conditions

While nutrition programs and facts for citizens during war are influenced by the exigencies of global battles and their effects on health at all ages and world food supplies, the fundamentals of securing better nutrition are not much altered in peace. Research facts are still necessary. Cooperation with other agencies remains desirable and expedient. The press, the radio, exhibits, timely and readable literature continue to be valuable vehicles for dissemination of salient nutrition facts and programs. It is true, changes in titles and emphases are necessary. Many new facts must be incorporated. But these alterations can be easily made. The more difficult and equally important next step in state nutrition programs is to coordinate nutrition education for professional groups returning or coming to new positions.

Basic Nutrition Information for Professional Personnel

The staff of every Department of Health, Welfare, Public Assistance or Public Instruction in all states has been enlarged and/or changed during the past year. Such changes will continue for several years until returned service men and women have exercised their G. I. educational opportunities and become settled in positions. These situations make definite plans for staff education in nutrition desirable and necessary for the efficient functioning of health programs.

Some effective methods of staff education now in use are:

For public health nurses

1. Inclusion of a practical course in nutrition in schools offering public health training
2. Attendance at short term or summer institutes at the State Agricultural College or other educational institutions
3. Participation by the nurse, families or individuals she serves, in some phase of nutrition study or survey
Such a study (now in press) on 20 children who were tuberculosis contact cases at Norristown, Pennsylvania, unified the educational procedures of the physicians, nurses and nutritionists in that medical district
4. All day institutes at regional, county or local levels
5. Frequent staff conferences including discussion of case studies involving budget or dietary problems
6. Consultant services of the nutritionist at clinic or center at regular or periodic intervals
7. Nutrition news releases weekly, monthly, bimonthly or quarterly
Such releases have been prepared regularly since January 1943.

For physicians, dentists and dental hygienists:

The same activities outlined for public health nurses either geared to the needs of each professional group or as

joint projects in a total public health program. 1, 2 and 3 may be most effective if done at the particular interest and subject matter level for each profession.

For case workers in welfare and social agencies

1. Practical courses on food, budgeting and nutrition in schools of social work. A recent survey¹⁸ made by the Community Education Section of the American Dietetic Association indicates many schools do not offer such courses and that there is a felt need for them
2. All day institutes at regional, county or local levels
3. Staff conferences where food budgets or special diets are worked out with case workers
4. Consultant services of a nutritionist to the agency at regular or periodic intervals
5. Setting up and interpreting food guides for working out quickly market lists for individuals or families in normal health or for various conditions such as malnutrition, anemia, tuberculosis, obesity, diabetes, gall bladder disease, constipation, ulcer and heart disease

NOTE: Such guides are being developed by the Pennsylvania Department of Public Assistance, The Committee on Nutrition of the Medical Society of the State of Pennsylvania, and the Division of Nutrition. After they have been

tested they will be presented to other state organizations.

For teachers in training and in service

1. Inclusion of health and nutrition courses in teacher training colleges
2. Attendance at short term or summer courses offered by State Departments of Health or Public Instruction or by Universities or Colleges
3. Participation in some type of nutrition research
4. Institutes or conferences at regional, county or local levels particularly for teachers in 4th class districts
5. Courses of study or handbooks on health and nutrition education prepared jointly between Departments of Health and Public Instruction personnel for use by teachers at elementary and secondary levels.

Uniting Forces in the Community for Improving Health

All groups in a population benefit from improved nutrition. The most far reaching effects in terms of public health are achieved when nutrition education and dietary improvement are directed to maternal and child health. The Toronto, English, Harvard and Pennsylvania studies have given ample proof of the relationships between better diets and reduction in toxemia, eclampsia, prematurity and stillbirths and the marked improvement in maternal and child health. More Pennsylvania mothers should

receive this information. Such plans are in progress.

The health and nutrition of school children have already received much attention in our state.

How much remains to be done is indicated in a personal communication received from Dr. Pauline Beery Mack on February 21, 1947. So that up-to-date facts might be presented a request was made for the latest available data from her laboratory on dietary adequacy of Pennsylvania children. The reply is as follows:

“During the past 12 years about 10,000 school children in various parts of the State have been carefully studied by a series of many different nutrition tests. Approximately 0.2 per cent of these children were classed as excellent; 15 per cent fair; and 85 per cent failed to exhibit reasonably good nutrition in one or more respects.

Analyses of what these children ate show the following deficiencies:

52 per cent in protein
48 per cent in calories
49 per cent in calcium
48 per cent in iron
53 per cent in vitamin A
52 per cent in vitamins of the B group
38 per cent in vitamin C”

One of the next steps suggested by these figures and by the results of the school health examinations is the initiation or extension of various programs at the community level.

In the Lower Yoder Township Schools (4th class district) in Cambria County a test program

was inaugurated in October, 1946. The examining school physician and dentist indicated the children whose physical or dental ratings were fair or low. Each of these children has received all the special tests given in the Mass Nutrition Studies at The Pennsylvania State College. Teachers and selected parents are also being tested. The findings are now being evaluated and interpreted to the parents through Parent Teacher Association meetings and home visits, and to the teachers through meetings at school.

The results of these special efforts in this county will provide interesting comparisons in terms of improved nutrition of children and teachers with a program of direct education with only the teachers in the 4th class district schools of Berks County.

The specific needs of industrial workers and of the citizens over 60 years of age have been recognized and some steps taken toward improving dietaries among these groups in the lower income levels.

In addition to the programs men-

tioned or as a part of them the following projects can serve as immediate aids to better dietaries for all Pennsylvanians:

- * Maintaining enriched flour and bread through legislation
- * Encouraging the use of iodized salt in the goiter areas
- * Extending the number and improving the quality of school lunches
- * Encouraging home gardens and the use of foods produced locally
- * Developing Local Advisory Health Councils¹⁹ for effective measures to deal with the findings of the school health examinations

To insure success in carrying out these activities continuous team work is required. Legislators, parents, schools and all public health and welfare agencies, civic and service organizations have their particular contributions and responsibilities in enacting suitable legislation and seeing that the benefits of all health and nutrition programs are shared by all groups.

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The Challenge of the New York State Nutrition Committee

By Miss May C. McDonald

Chairman, New York State Nutrition Committee

THE NEW YORK STATE NUTRITION COMMITTEE is now 11 years old. During this period the pattern of its activities has changed to meet the needs of the moment but it has constantly held to its chief objectives.

We organized to provide a means whereby representatives of State agencies that have a program which reaches into communities can be brought into active cooperation in order to perform six major functions.

1. To study nutritional needs and to see how well the current programs are meeting these needs.
2. To effect correlation of programs so as to bring about better nutrition in all homes of the State.
3. To be ready to function as a coordinating group which can serve the state in an emergency.
4. To stimulate the organization of local nutrition committees; to offer constructive suggestions for their programs; to support the efforts of agencies that can help them work effectively.
5. To organize State and regional nutrition conferences and training schools so that professional and lay leaders may be informed of major



Fortified bread improves Nation's health.

- emphasizes that need concerted action.
6. To keep all members informed of research under way or contemplated.

This is our chronicle:

1937-1938: We organize—the head of each agency officially appointed the person or persons to represent the agency. This was a period of pooling information as to existing programs and unmet needs, and mutual sharing of knowledge and skills.

1939: We had our first Nutrition Conference. It was with trepidation that we announced a confer-

ence for State people to be held at Cornell University. Two hundred persons came. They, included physicians, dentists, dental hygienists, social workers, teachers of nutrition and health education, state and Federal extension workers, and lay members of boards of non-official agencies, etc. Representatives assembled from 10 states and several foreign countries.

The American Red Cross, whose field work in nutrition during the preceding 10 years had been considerably restricted, sent a nutritionist from each of six states.

From members of this conference we received an urgent request to (1) hold an annual Institute and (2) assist in the organization of city and county committees in this State and to furnish leadership and direction to them.

1940: Our country began to look to its own defense. The United States Department of Agriculture suggested to the Land Grant Colleges "that there be set up in each state a committee to deal with nutrition in relation to defense and defense committees". Dean Carl E. Ladd, who represented the above agencies in New York State, recommended that the State Nutrition Committee be designated as the committee to deal with problems of nutrition in relation to defense. The head of each agency was requested to authorize its representative to continue their activities and to deal with nutrition problems related to defense.

Thus the State Nutrition Committee and the majority of the local committees became a segment of State and local defense councils.

For the first time we received financial assistance. We required an office and a field staff, and an official report was made to the Governor each month.

We held our second State Nutrition Conference at Cornell University with approximately 400 persons attending. Although no attempt was made to publicize the conference beyond the borders of the State, representatives from 10 other states came, the District of Columbia and several provinces of Canada. Because of the nature of the audience and the diversity of their interests the program was planned so as to (1) summarize and interpret technical advances in nutrition; (2) examine and appraise present programs and practices; (3) devise new and more effective methods based on the needs of individuals and of families; (4) clarify the place of nutrition in what might be called the "scheme of things."

The overall theme of the conference was "The Coordination of Community Effort for Better Nutrition."

1941: This was a year of many activities both by the State and local committees, only a few of which can be mentioned. We took part in the National Nutrition Conference held in Washington. At the request of the Conference Board of Women's Educational Organizations, the committee sponsored a "Nutrition Fortnight". This was opened by proclamation of the Governor. Forty-nine county and city committees reported activities, which included newspaper publicity, exhibits, talks, radio pro-

grams, and the showing of films. The number of newspaper articles which resulted totalled 1,486.

An almost overwhelming demand for nutrition classes resulted. A nutrition course was prepared and taught locally by persons who were officially accredited.

1942: The financial aid which was first given to the Committee by the Governor in 1941 for the State Committee's activities was continued, \$10,000 being allocated for the work until January, 1943.

The State War Council established an office of War Nutrition Services as the coordinating unit for direction of nutrition activities in the State war effort. The Committee's paid staff were transferred to the new unit. This agency took over our former relations with local nutrition committees, as the majority of them were absorbed in local war councils.

1943: An active program was organized throughout the State by the Emergency Food Administration. The State Nutrition Committee continued to hold its meetings to consider matters of inter-agency interest and the best ways in which to contribute most effectively in the furtherance of State programs.

1944-1945: The number of agencies represented on the Committee had greatly increased by this time. This factor and the wartime travel difficulties caused a change in operations in that the full committee met less frequently and the executive committee carried on during the interim. Because of travel and housing difficulties no Institutes were held.

1946-1947: The effort has been to have the field staffs and the member agencies and the local committee members become a more integral part of the State Committee.

In addition to the annual Institute, four regional meetings have been held. Smaller sectional meetings will be organized during the spring and a state-wide conference will be held at Cornell University next summer.

The city and county committees conform to the general characteristics of the community and therefore differ widely in size and composition. For example, in New York City at one time there were 97 organizations represented in the food and nutrition committee. They maintained an office and had a paid secretary. There were other communities having few professional workers that had a very small membership. The diversity of membership is shown by the fact that the chairmanship of the local committees had been held by a doctor, grocer, farmer, member of a State department staff, minister, and interested but untrained lay persons. Erie county recently has published a roster of 28 agencies which are now included in its committee.

Purposes of County and City Nutrition Committees

1. To provide a means for lay and professional people who are sincerely interested in better human nutrition, to meet together and to learn about the programs and ob-

jectives of each institution or agency operating in the community.

2. To view the entire nutrition situation of the locality and discover ways of meeting needs through
 - (a) Coordinating those programs of agencies where unified efforts are needed.
 - (b) Undertaking new programs by the Committee as a whole, or by one or more of its member agencies assuming new responsibility to meet needs.
 - (c) Encouraging the maximum use of the services of each member agency by expanding their present programs.
 - (d) Through stipulating the community to develop new resources to meet needs that cannot be met by existing agencies.
3. To explore ways in which persons with nutrition training can better serve their communities.
4. To establish some common nutrition objectives toward which each member agency can contribute through its regular program.
5. To establish the nutrition committee as a recognized community clearing house for nutrition problems, programs and activities. The active cooperation of State food and nutrition workers when they are in the counties are helpful here.
6. To provide professional improvement opportunities through informational features at regular meetings, and through exchange of views and information among workers.

At the present time there is a great need for the nutrition committees to take their part in this period of readjustment. It is a period in which to consolidate gains made during the more intensive wartime programs and to realign agency programs towards the needs of peace.

Starvation and deprivation in any part of the world is a threat to peace. Research studies made to measure the effects of starvation on human subjects have shown that starvation affects more than physical stamina. The men who were used possessed a normal and, in some instances, a high degree of the ability to cooperate and a willingness to serve the common good. As the stages of starvation advanced they became progressively less cooperative, finally having an interest only in their own food and their own condition, even in some instances developing anti-social tendencies.

There are indications that many people in this country are questioning our continuing to furnish food to starved peoples throughout the world. Some feel that our contributions should be limited to the "grateful people". Should it be expected that people who have been starved for a long period of time, accompanied by other deprivations, can be in a grateful mood? Is it

not more than should be expected of them?

The efforts of many persons and agencies are needed so that the general public can be informed as to the world food situation. Nutrition committees have a share in this responsibility. They should not only work for the betterment of the nu-

trition of our own people but also be interested in developing in all peoples the physical ability to co-operate through improved nutrition; so that we as a people will be willing to do what is necessary for the better nutrition of people throughout the world and thus create a prop for peace.



Too many vitamin vans are filled with nutrient-robbing beverages and candies.

—USDA photo by Knell

New York City's Nutrition Program

By Dr. Israel Weinstein

New York City Health Commissioner

GOOD NUTRITION is just as important now, in the post-war period, as it was during the war. There has been a lot of research on nutrition, and we know that the prices of foods and food substances do not run parallel with the nutritive value of the foods. Unfortunately, that is not general knowledge.

The New York City Health Department has, for many years, had a very keen interest in the subject of nutrition. Ever since the formation of the Department of Health the study of nutrition was an important phase of its work. Some years ago there was a very practical step taken in the formation of a demonstration cafeteria in the Department of Health. About four years ago a nutrition division was established. It was established with the aid of private funds. The City has taken that over now and has its own appropriation. We have seven nutritionists, and there are appropriations in the next budget for two more nutritionists. These nutritionists work very closely with the doctors and the clinics. They have given courses of instruction to our entire staff of physicians, nurses and health education workers. They also serve as consultants to other staff members. The nutrition division prepares bulletins on timely nutrition problems for periodic release. It arranges for lectures, demonstrations and exhibits.

Nutrition Clinic

The Nutrition Clinic conducted by the Health Department is a unique service. Here children and adults suspected of nutritional deficiencies are examined by the most modern methods. Where deficiencies are found, instructions for correction are given and re-examinations made. This important work is also carried on in the hospitals, for diabetics, nephritis, cardiacs must learn how to prepare their own diets so they shall not be bedridden and do not have to be institutionalized. It is possible for many of them to go out and enjoy useful lives but they must understand the nutrition problem as it affects them. Medicine has gone way past the days when physicians are concerned only with those who are in ill health.

Prevention has the important influence today. An ounce of prevention is worth a good many pounds of cure, if I may paraphrase an old adage. We are in a high state of good health throughout the country. I don't need to quote statistics to prove proper nutrition is an important factor contributing to this condition. It is more important in some sections of the country than in others, but there is not a section today where this does not apply; there is not a general, clear understanding of nutritive values. They can eat tremendous amounts of food and

spend tremendous amounts of money and yet slowly starve.

Mayor O'Dwyer believes firmly in a good nutrition program, and that it is just as important in building a good, strong peacetime America as it was in wartime.

May I say that we in the Health Department feel that the school lunch is a subject that cannot be minimized. Not only is it important to give school children a good, nutritious lunch, not only is it

important that they have well-balanced meals so that in this important stage of their development and growth they are not handicapped, but also that what they do eat is the proper food for them. With the operation of school lunch programs they can, and they can see the proper type of foods and get used to them, in that way. That type of education is more valuable than any form of reading that they can get from their textbooks.

The Extension Service and Nutrition

By Miss Vera F. Brush

County Home Demonstration Agent, Suffolk County Extension Service

WATER covers three-fourths of the earth's surface and has been here for millions of years, yet it still can do a boy's face and hands little good unless he uses it. Nutrition teaching may be fine but its real worth shows up in the most wonderful piece of sculpture in the world—a sturdy, well-formed, happy child. Mothers who, amid all the activities of bringing up a family, catch the vision of the Builder, appreciate that the work they have chosen is indeed an art. No longer is it three meals a day with too much waste on Jimmy's plate, but it's the right choice of foods, well prepared, and tucked away into each tummy, large or small. "Keep well" is one of their mottos. Cooperation of fathers, in revising some of their own food habits in the interest of good family nutrition, is basic if mothers are to succeed 100 per cent.

In the nutrition program of the Extension Service in Suffolk county the aim has been to teach the fundamentals of good nutrition. The daily needs of the body, the values of different foods, their selection and preparation, are studied. Thought is also given to so preparing and serving food that the family not only eat but thoroughly enjoy their meals. The Extension Specialist in Foods and Nutrition from the State College of Home Economics, who has worked with food leaders for the past nine years, has inspired her

classes to action. Those who have studied with the Specialist are convinced that good health and sound nutritional practices are closely bound together.

In Extension Service work the homemakers in this county might be classified into three groups, those who belong to community units which carry on homemaking projects, those not in the groups but who know there is an Extension Service Office at the Court House where they can get information when they want to know something in a hurry, and those homemakers who have little contact with organizations and are not aware of the services available from government agencies, upon request. The Extension Service teaching reaches many in all three of these groups as information and good practices always spread from friend to friend.

The County Home Demonstration Agent experiences a special thrill when, in casual conversation with someone in a store or restaurant, she learns that this homemaker, who doesn't even know there is a Home Bureau, is unknowingly putting some of its teachings into practice in her own home. "Mrs. Adams told me the grandest way to prepare a salmon loaf using sour cream" and forth comes the same recipe used in a nutrition lesson on getting plenty of Vitamin-A in your diet.

Nutrition Programs

What are some of the nutrition programs of the organized County Extension groups and how are they planned and carried out? Each Spring the officers and local leaders of the Home Bureau units join in a county meeting to plan the Extension program for the coming year. The entire homemaking program (which opens in September) includes family life, clothing, housing, home management, and gardening, as well as work in nutrition. In planning the nutrition part of the program, homemakers discuss the values of the past year's work and what they liked or did not like about it. Then they express some of their present-day needs and problems and those of other women in their communities. The Assistant State Leader, or sometimes the Specialist as well as the Home Demonstration Agent, is present to help with the planning. Requests for assistance in training local leaders in the chosen projects are sent to the State Extension Office by the Home Demonstration Agent. In the fall or winter the Extension Specialist from the Foods and Nutrition Department at the State College of Home Economics comes to the county and conducts these training schools for the leaders. The leaders, in turn, carry the nutrition information they are taught to their local groups.

Though long courses are not undertaken, each year some nutrition project is studied. The homemakers who keep on studying from year to year realize how great is the field, and how little they know. They realize that human nutrition

has lagged behind animal nutrition and look to research for more and better knowledge to put into use. Each year the Extension Specialist includes some of the latest findings in her lessons and thus homemakers keep up-to-date in the progress of nutrition knowledge.

Some of the chosen subjects homemakers have studied in Suffolk County work are—"How to Cook Vegetables to Save Minerals and Vitamins" and to have the best texture, flavor and appearance. Homemakers have mixed a little psychology and artistry into their vegetable cookery so that children and adults alike really enjoy them, rather than somehow just manage to eat them, or maybe not. The sink drain does not receive the dissolved minerals it once did in wasted cooking water either.

Another project taught was "Foods for Good Digestion." Diets nutritionally right for both types of constipation were studied and prepared. One homemaker whose husband was a druggist declared the project so effective it was mighty hard on his business, but still believed in right food selection for good digestion. The use of mineral oil was found to be quite general, but after its dangers in vitamin loss were learned it was taken off many medicine shelves and interest waned in using it in salad dressing. Although not many were seriously concerned about low residue diets for spastic constipation, those who took training were able to be of help in passing on correct information to some, who were most grateful.

A project on "Controlling Your Weight Safely" interested both

those who wanted to lose or gain weight. Though the number who reached their correct weight by exercising self-control over an extended period might have been greater, a large number of homemakers learned how safe dieting should be undertaken. They were able to read, critically, magazine advertisements offering quick results and to warn others of the dangers of wrong dieting.

War-time Projects

During the war years homemakers asked for lessons on solving different food problems, as they arose. The chief of these, during the shortages, was selecting foods which would keep the family well-nourished and happy about their food as well. Making sugar, fat and meat go farther, or learning how to partially replace them with other sweets or oils or proteins without lowering nutritional standards for good health, concerned all who had to feed a family. Homemakers were interested in the use of leftovers and the making of one-dish meals as time-savers. Demonstrations on making homemade bread and holiday foods were requested too.

Extension homemakers also selected projects in which they wished to have especially featured, chicken, fish, eggs, and the use of cheaper cuts of meats. Also, cakes, cookies and desserts made with less sugar or other sweetenings, were included during ration years. These not only helped stretch sugar and fat for home use but made possible the large number of cookies and cakes sent to camps and hospitals.



Many homemakers of the Extension Service, with patriotic zeal and the assurance of a good winter supply, not only filled their own larders with preserved foods but aided neighbors and friends who had never canned before. They sought the latest methods and they were thus qualified to serve as neighborhood consultants in their communities. Some helped man the County Food Preservation Trailer, which parked at the four corners of the larger villages, and took food preservation methods to the homemakers as they shopped on Main street. Here many women who never attended Extension meetings eagerly examined the exhibits, asked questions, and told of their problems in gardening and canning. One woman dashed to the trailer one morning and asked about a jar lid—then said “Had to come downtown for some more jar rings but am I thankful. You’ve saved my whole basket of peaches for they are ready to go in the boiler and the lids are all on wrong,” and hurried away! She came back in the afternoon to ask more questions.

Beside the trailer visits, the exhibits, and the bulletins distributed, information centers were arranged in different food markets in the larger villages. Here still more canners were reached. Surely

the spoilage loss of new canners was greatly decreased by the help given them by the experienced.

As new homemakers are constantly coming into Extension groups, basic nutrition information has to be repeated in many projects. This helps to drive home the most vital facts but there is always enough new information, together with a new lesson in food preparation, so that a repetition of fundamentals is not monotonous.

In a recent project on "Foods for Normal Growth and Development", leaders studied "Foods for Building Good Bones and Teeth", "Foods for Strong Muscles and Other Tissues", and "Foods for Building Good Blood." In the first two lessons no general food dislikes were met, but in the lesson on the Building of Good Blood, the fact came out that liver is not used at all in some families because one or more in the family will not eat it. Also, this dislike was quite general among small children. One of the leaders, a mother of three children, told the training school group that she had fed her babies liver soup and that the whole family enjoyed liver. In the food preparation connected with this lesson, there was a casserole dish of well-seasoned meat-balls made of ground beef and ground liver, baked with vegetables. Leaders are reporting that those who like liver would rather have it alone, but homemakers who do not serve liver found they liked the meat balls and are getting liver into the family diet by camouflage. Kale, a vegetable little used in many families, was a lively topic of discussion among the leaders. Ways in which some families really

like it prepared, were exchanged. Besides the nutrition lessons, this sharing of experiences among homemakers in the Extension training classes and in the community units, often puts new interest in the feeding of families.

As few of the Polish homemakers in the rural areas attend Extension meetings, a special worker was engaged in the summer of 1946 to make home calls on this group. Nearly 300 were visited. Some of them help on the farm and nearly all have beautiful flower gardens and well-kept lawns. They were most hospitable and appreciative of information given them on canning of fruits, vegetables and meats. In conversation, questions often arose about the use and care of the pressure cooker and the home freezer. Sometimes advice was asked on their use, or on buying a new piece of kitchen equipment. The opportunities available to them through the Extension Service were explained. Though some of the older women could not read English, they knew their daughters, or sometimes the new daughter-in-law would be so glad to have the bulletins.

Questions from the Kitchen

By personal call, telephone or letter, various types of requests come to the Home Demonstration Agent's desk. Questions on methods for food preservation were the most frequent, during the ration years. Besides those on fruit, vegetables and meats, there were calls on "How do you can, freeze, smoke, or salt different kinds of fish and some of the other sea foods common

to Long Island waters?" More recent calls include some preservation, but also the preparation and nutritional effects of different foods. Some requests received follow:

"How do I can chicken fat in glass jars?"

"Is it better to can chicken cold or hot?"

"Do you need to process young chickens as long as old ones?"

"May I borrow the Home Bureau tin-can sealer, and where would I buy cans? I want to send some lard to my sister in Europe."

"Will you please tell me how to can fruit for a diabetic? Will applesauce keep if you don't use sugar?"

"Do you have any recipes I could use for a child who is allergic to wheat and rye flours, and to eggs and cornstarch?"

"Have you any bulletins on feeding small children? I have one grandchild who doesn't like milk."

"Grandmother has broken her arm and it's not knitting very well. She never drinks milk. How can I get her to take it?"

"We learned in a nutrition lesson that everyone had to have a little copper in the body to have good health. Please send me a list of foods that contain some copper."

"Do you have directions for making sauerkraut? We've never made it before but have such wonderful cabbage we want to save."

"We've just killed our pig today. How soon before it's all right to eat the liver?"

"What do you think is the best way to preserve eggs? We're having more than we can use now."

"We are having lots of milk. Can you give us directions for making cheese? I don't mean cottage cheese but real cheddar cheese."

"We've just bought a home freezer. Please send us all the bulletins you have on freezing. I have a lot to learn."

"Have you directions and drawings for building a home freezer? We want a good-sized one."

"What should you do with the cream, and how do you make butter if you want to store it in the freezer?"

Homemakers, in sending in letters or reports, have told of the benefits derived when they have put nutrition information into use.

"Since we've been eating less starchy foods and getting plenty of fruit juices and green and yellow vegetables, our family has had very few colds."

"The food and nutrition work has helped me so much to get vitamins in a special diet for an asthmatic or allergic son. The Extension classes have also helped me to set a better table both in appearance and food value."

"The Home Bureau has been a source of learning and budget-saving. Through the projects and newsletters I've learned to have more nutritious food, economically."

When questions come in to the Extension Office on the Hot School Lunch, or the Lunch Box, bulletins are furnished and the request referred to the Nutritionist of the County Health Department, who is doing intensive work in this field. Also, questions on special diets in



Workers need balanced lunch.

disease are turned over to the Nutritionist.

The Extension Office informs young mothers of the bulletins available from the Children's Bureau at Washington.

Thus, many progressive home-makers in Suffolk county, through

group study or by individual requests, make use of the opportunities offered by our State and by the Federal Bureau of Human Nutrition and Home Economics, to learn nutrition facts and to translate them into daily living.

Dietary Aids and Dangers for the Aging

By Dr. C. Ward Crampton

Chairman, Sub-Committee on Geriatrics, Committee on Public Health, Medical Society of the County of New York

TODAY a man of 60 may be as young, vigorous and vital as the average man of 40. On the other hand, he may present the common picture of the man of 80, old, weak and miserable.

Whether a man is old or young at 60 depends much upon the diet.

Scientific research is constantly reporting and physicians are applying new revelations in the field of diet and nutrition. Much of this the citizen should know and may use for his own benefit. For this purpose, we present the three most important nutritional deficiencies that can be aided by a corrected diet and two of the most important nutritional dangers that also can be aided by dietary means.

The foremost nutritional defects in the mature and aging are calcium, iron and protein. Seventy-five per cent of the men of 60 suffer a lack of one or more. On the other hand, many suffer dietary excesses, notably carbohydrates and possibly cholesterol.

Calcium

The American diet is more deficient in calcium than in any other food element. Our ordinary menu is calcium poor. This deficiency accumulates and becomes more and more serious as the man grows older.

The blood contains about 10 milligrams of calcium per 100 cubic centimeter and it will main-

tain its level even if it has to rob other tissues. Thus, in aging, the blood robs the bones, which are largely calcium. The bones become more fragile; a condition called osteoporosis results, and is seen clearly on the X-ray plate.

Animals deprived of calcium for 10 days become languid and weak, their bones soften and they quickly die of pneumonia or other infections.

The daily needs are about 15 grains. A quart of milk daily will supply this. It is the natural food of the young; but cream, however, may be bad for the "gouty and arthritic". This is not as yet fully established, but some arthritics definitely do much better without any milk. Calcium is not contraindicated in arthritis even though there are some calcium deposits, osteophytes, in and around the joints. (List of calcium rich foods and lists of percentage of calcium in body tissues are readily available and need not be presented here.)

Calcium constitutes 1.5 per cent to 2.2 per cent of body weight. Calcium phosphate and calcium carbonate account for 95 per cent of the mineral content of bone. 99 per cent of the calcium in the body is found in the teeth and bones. It is necessary for the orderly action of the heart and clotting of the blood. Nerve action is impossible without calcium. It is essential in iron metabolism and it

protects the body when iron is subnormal.

Calcium is used in ordinary living processes. It is found in nerve and brain cells and is expended during nervous work and especially in emotional states. Emotional people are calcium wasters.

Calcium is thrown off and excreted in large quantity as calcium oxylate.

Sexual excitement may cause a large amount of calcium excretion in a short time. For this reason it is sometimes considered good practice to give 60 grains of calcium gluconate or lactate on occasion. This may be especially valuable to the mature person.

Calcium in excess of normal needs is conducive to a feeling of well-being. Calcium should be balanced with phosphate intake in the proportion of 1 to 1½ or 2. If phosphorous is in excess, decalcification will result and all body cells suffer. Milk contains 4 parts of calcium to 3 parts of phosphorous.

The most natural way to get calcium is in the food. The best food is that which has been accepted and approved by use for countless ages by all the mammalian animals in the world—it is milk.

Milk contains calcium in its complete and exact biological setting. We are sure of its acceptance and its utilization by the body. It is important, however, to adapt milk to the aging years when we need less fat, less carbohydrate and more protein, but still need its tried and tested biological elements—vitamins, calcium, iron, copper, manganese, cobalt and other trace elements.

Efforts have been made to provide a special processed milk for the aging. These efforts are highly approved and should be followed with interest.

The yolk of an egg is rich in both calcium and phosphorous but contains so much cholesterol that the aging man, with due regard for his coronary arteries or high blood pressure, may shun the egg yolk, especially if the blood cholesterol is above 200 milligrams per 100 cubic centimeter.

Some foods contain oxalic acid which is a calcium binder, if not a calcium robber. Beet greens, spinach, cocoa and rhubarb with all their other values have this handicap. Dandelion greens, kale and turnip greens have no oxalic acid. Dandelion greens have high available calcium with high protein content and make a highly desirable spring salad. We shall see other examples of food antagonisms.

Calcium is the friend of youth at any age. A liberal supply well beyond bare necessity makes every year of life fuller and stronger. It aids better development in the young. It extends the prime of life in later years. It is one of the secrets of youth prolongation.

Calcium poverty is one common cause of aging that can be corrected. A grain of calcium lactate for each year of your age daily taken in three doses, three hours after each meal, is an example of prescription after thorough examination, as part of a well-rounded program based on knowledge, judgment and experience.

Calcium is not all of diet nor is diet all of nutrition.

The Seven Factors Of Nutrition

Nutrition is more than diet. A man may provide his stomach with a perfect diet including calcium and yet have a body that is weak, malnourished and calcium poor, his bones fragile, his nerves tense and heart action disordered. Diet is not the whole story of nutrition. It is only one of the seven essentials of nutrition, as follows:

1. Diet and food intake with regard to quantity, quality, balance, combination and timing.

2. Digestion—Transformation of food in the digestive tract by digestive fluids into forms which can be absorbed. This depends upon provision of good digestive glandular products, all under autonomic nervous system management, *unhurried* (i.e. no cathartics, no diarrhea) *serene* (i.e. no nervous spastic tightness) and *competent*, (i.e. complete chemical and mechanical preparation for transit through the walls of the tract.)

3. Absorption—Transmission of digested food through the walls of the stomach and intestine into the blood and lymph circulation. This requires vital, healthy, receptive digestive tract tissues.

4. Processing and Further Transformation—Food products in the blood are again processed, notably in the liver, into forms that can be transported to the tissues where each particular kind is needed, accepted and utilized for function and structure. The processing of protein fractions (amino acids) into tissue albumens is especially a liver responsibility. Other

notable transformations occur in the reticular endothelial system (lymph nodes, etc.), where hormones, enzymes and antitoxins are made. These are globulins, high class specialty products which regulate, vitalize and defend the internal life of man.

5. Utilization—of transported food in the tissues of the muscles, nerves, brain, organs and where it is used for a hundred different life process purposes.

6. Meeting Excessive Demands—Fever, burns and hemorrhage make excessive demands, and sick or damaged organs may rob the rest of the body of its proper nutritional quota. For example, "renal ricketts" is a body calcium starvation accompanying a certain kind of kidney disorder. Another kind may rob the body of much of its proteins.

7. Excretion—This may be too slow, causing disturbance in body chemistry or too rapid, resulting in waste and tissue poverty.

These are the seven pillars of good nutrition. They support health, vigor and a youthful longevity. Not one should be neglected in the care and management of life at any age. They should be routinely examined and tested before they become worn and crumble. This will be referred to later. Meanwhile consider the second most common dietary deficiency in aging—iron.

Iron

The organs cannot breathe unless iron brings them oxygen. Oxygen is brought to the tissues from

the lungs by the hemoglobin in the red cells of the blood. The active basis of hemoglobin is iron. Iron is the minute to minute essential of life in all the higher animals. In some of the lower animals (the octopus, crabs and snails), copper serves the same oxygen-carrying purpose as iron. The blood is colored blue by hemocyanin instead of red by hemoglobin.

Iron deficiency is almost always present in the uncared for man in the higher-age brackets. The typical man of 60 is anemic, iron poor and body poor. This is unnecessary. It is worse by far in those who are on an unguarded diet for "dyspepsia" and "indigestion".

Lack of teeth results in refusal to eat rugged iron-containing foods like meat, which also contains the vitamin B complex, especially thiamine and the newly studied folic acid added to the diet may produce almost magical results in anemia. This new vitamin which stimulates both white and red blood cells is derived from yeast and liver. It can be manufactured pure but it is less efficient than the natural form.

Iron poverty often arises from deficiency of hydrochloric acid in the stomach. This "hypochloridia" is so common in the elderly that it must always be looked for when the hemoglobin is low. The condition can be aided *but not cured* by giving the necessary acid with meals.

Iron poverty may be due to poor diet, poor assimilation or loss from hemorrhage. It is hardly ever an isolated phenomenon. It has its underlying causes which must be

treated and usually there is a cause behind each cause.

While iron is processed into hemoglobin molecules in the red bone marrow, hemoglobin is used up rapidly, especially during the waking and working hours.

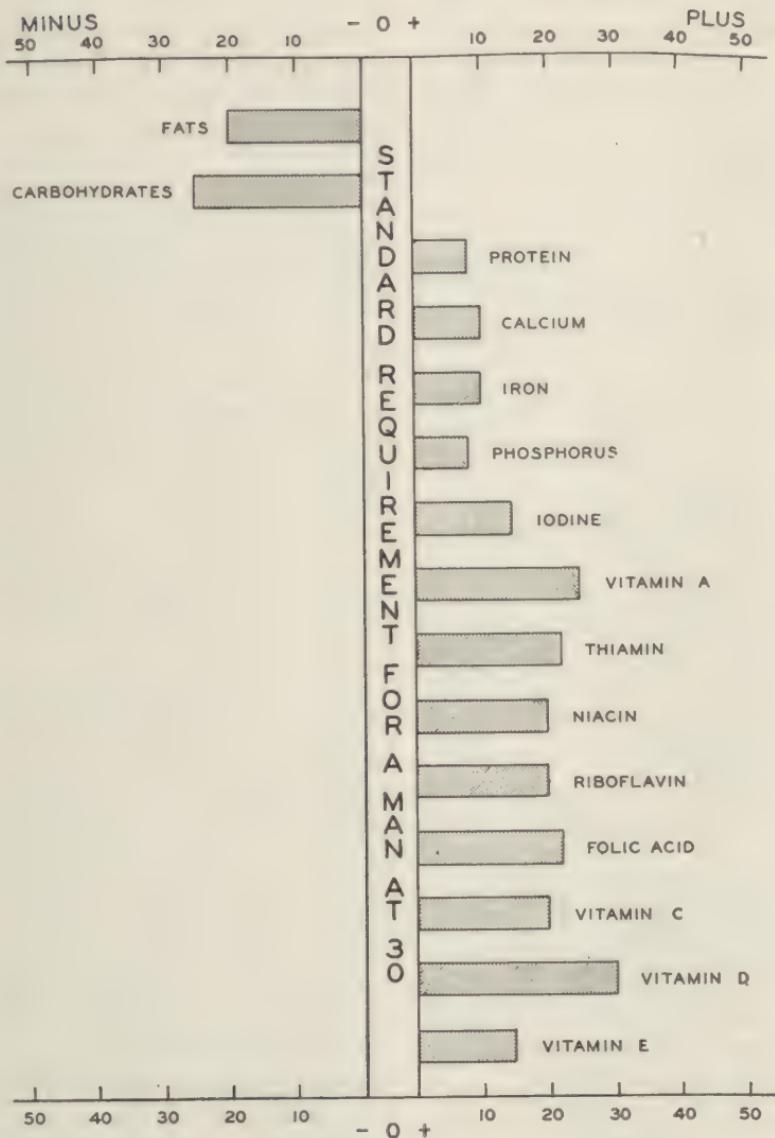
One million times one million red blood cells, more or less, are used up every day. They must be replaced every day with new cells all containing their effective quota of iron. Here is where the body is very clever. When red cells are used up, the iron is saved and put into use in making up the new trillion cells;—new cells, old iron. The margin of waste of iron in health is small, but if any one of the body organs, spleen, liver or bone marrow, or their supporters, become tired, sick, aged, crippled or rebellious, more iron and some good medical aid may be very necessary.

The liver plays a large part in the hemoglobin metabolism. In some persons it seems that no amount of iron will cure the anemia, unless crude liver is given and some anemia cases will not clear up unless thyroid is given.

Pure chemical iron is a poor remedy for iron deficiency. A trace of copper will aid its absorption. We should get 2 milligrams of copper per day in our food. Molybdenum, cobalt and manganese are now being utilized as processing aids and their peculiar values are subject to further clinical trial and laboratory research.

Iron-containing foods usually have some trace of these elements, but food grown on mineral-poor

HYPOTHETICAL PLAN FOR NORMAL MAN OF 60 COMPARED WITH
STANDARD DIET AT 30



ground is poor in iron, calcium and phosphorous and other trace elements as well. These elements are essential to other body processes, sometimes in strange and unexpected ways. For example, a herd of sheep in Canada gradually lost ability to produce live lambs. It was found that the ground lacked cobalt and cobalt added to the diet caused the sheep again to breed live lambs.

Lack of copper in food was discovered to be the cause of "the falling sickness", a fatal anemia which killed many African cattle until copper was replaced in the diet.

It is suspected that trace elements have a far greater role in youth prolongation than we have yet been able to demonstrate. Under normal conditions sufficient iron may be obtained in a well-rounded diet of familiar pattern. In aging it is especially important to see that the essential processing organs, stomach, liver and thyroid are well-supported. Additional iron in ferrous form with trace elements may be given with profit according to the physician's balanced judgment.

A thorough medical examination with special attention to the seven pillars of nutrition is the essential foundation of the prolongation of youth and vigor during the sixth, seventh and eighth decades. This will be referred to later.

Proteins

The third most common form of malnutrition in the aging is protein poverty. The living body is made largely of proteins, therefore

protein poverty affects the whole man. Protein poverty causes three common evil conditions typical of aging: 1. anemia (low hemoglobin), 2. asthenia (general weakness) and 3. oedema (collection of stagnant fluid in tissues of ankles, face and abdomen). Resistance to infection is diminished and all diseases are increased in frequency and severity.

A new era of medicine is beginning, the era of protein research, diagnosis, nutrition and therapy in every phase of health and disease.

Protein poverty is an especially common factor in the disability and weakness of old age, but it can be recognized and it can be prevented and much of the disability and weakness of aging can be definitely removed.

Epidemics and low protein diets are definitely related. Nutritional oedema from protein poverty is a common and increasing condition in Europe. Cirrhosis of the liver, long thought to be due to drinking alcohol, is caused mainly by the habit of alcohol addicts of not eating enough protein. A too low protein diet plays a large part in the causation of ulcer of the stomach. Protein feeding is an element in the latest treatment of ulcer. Protein deficiency is probably a factor in most, if not all, diseases of kidney, liver and blood. The cause of protein nutrition must be looked for in all the seven departments of nutrition.

Deficient protein in the diet is often due to the prevailing belief that protein intake must be diminished in cases of nephritis, arthritis and high blood pressure. There-

fore meat, eggs, milk and high protein vegetables are reduced. This is largely erroneous. Even though these diseases show an increased blood pressure and albumin in the urine, ample new dietary protein must be supplied or the evils of malnutrition will be added to the burdens of disease.

A second cause of protein poverty is a blind but starry-eyed adherence to dietary fads. Some of our worst cases of malnutrition are found among the most ardent addicts of so-called health diets.

Lack of efficient teeth to chew meat will cause lack of protein as well as iron and Vitamin B.

Protein poverty as well as iron poverty will be caused by lack of hydrochloric acid in the stomach secretions. This "hypochlorydia" occurs in about 40 per cent of men over 60. Proteins are then broken down (hydrolyzed) into their component amino acids in preparation for their absorption. The protein molecule is enormous. Its molecular weights range from 35,000 to 910,000 units. Each protein is made up of building blocks called amino acids, each containing nitrogen. There are some 23 amino acids. Ten are essential to life. When proteins are digested, they are "hydrolyzed" or split up into their component amino acids, then they can be absorbed. They are then reassembled in various new combinations to resupply and rebuild the different kinds of protein needed by the different body tissues.

To summarize:—protein poverty may be due to low intake,

impaired digestion, impaired processing in the liver, increased use, waste and break-down of protein tissue (as in hyperthyroidism) and by excessive loss and excretion of protein in illness, for example, in chronic nephritis.

The minimum protein daily requirement of the body of a 70 kilogram man is 40 grams. This is much too low for safety and comfort. People generally require about 70 grams or one gram to one kilogram of body weight and 100 to 150 grams may be better.

Proteins vary in biological value according to their amino acids. Each of these amino acids has a distinctive service. We are beginning to use them as medicines. They can be injected directly into the blood stream. Methionine and cystine, for example, contain sulphur, a distinctive and essential element. Valine and tryptophan have relation to sex support, etc.

In the use of food elements as medicines we find also effective vitamin A in acute catarrhal colds, vitamin D in arthritis and niacin in headaches.

Protein utilization in the body is not merely a placement into tissues followed by use and excretion. There is a complex interchange between the blood and various tissues in a constant interplay of substance.

Food proteins differ greatly in their biological potency. Milk, eggs, fish, yeast and soybeans are among the leaders in value. Food protein efficiency may be measured in—(1) its value in promoting growth, (2) its ability to replace used-up proteins and (3) tissue.

All food proteins may thus be classified as to their real value.

On the other hand some proteins sometimes do damage. They rob the body of other food substances. "Avidin" a substance found in raw white of egg causes "egg white injury" and skin disease in white rats. It will neutralize the egg biotin which is a potent growth factor and which also aids disease resistance.

Raw fish will neutralize a great deal of vitamin B₁. A half dozen raw clams at the beginning of a meal may rob the whole meal of its valuable thiamin vitamin. Cooking the egg, clam and fish removes this food handicap. Some persons are allergic to some proteins which cause asthma, hives, etc. A child may get an attack of asthma if fish is cooked in the house.

The study of the uses and values of proteins in the aging is making rapid strides and much more is on the way.

Additional Dietary Deficiencies

Additional deficiencies of importance include the following:

Vitamin A in liberal quantities may work a great transformation for the better in many a man of 60 who has apparently nothing the matter with him except "age". This is because many have long been on a vitamin A deficient diet and have accumulated a deficit; one symptom is "night blindness".

The liver is full of vitamin A which has been known as a cure for night blindness for 3,446 years as indicated by the Eber's Papyrus of ancient Egypt. This remedy

must have produced results, for 1000 years later, Hippocrates, the "father of medicine", recommended for night blindness the following procedure: "The patient should eat once or twice an ox liver as big as possible, raw and dipped in honey." He knew the appeal of sugar coating in medicine.

There is a substance in yellow corn which is thought to rob the body of nicotinic acid thus predisposing if not actually causing pellagra, primarily a nicotinic acid deficiency disease, common in corn-eating localities. It is called 3-acetyl-pyridine. It is almost the chemical twin of the life essential nicotinic acid; just the difference between COOH and COCH₃ at one corner of the molecule.

Thiamin deficiency is frequently the cause of lack of appetite, irritability, numbness of hands and feet, headaches, backaches, fatigue, constipation, nausea and poor food digestion, poor absorption and faulty food processing. Large quantities of thiamin are needed every year after 40. In a home for the aged, old people were transformed by thiamin into alert, cooperative, active folk with a good appetite for both food and life.

Niacin and riboflavin may also produce striking changes in the well-being of the older people when deficiencies exist.

Iodine poverty is a common accompaniment of aging after the fortieth year. The basic requirement is .2 milligrams daily. An active over-tired man of 50, with beginning thyroid inadequacy, may get as much stimulation and

far more real benefit from a few milligrams of iodine as he will from a cocktail. Iodine-containing food may be emphasized in the diet, iodine supplement given with profit in many aging men and women.

These are the most common nutritional deficiencies in the aging. Their presence may be discovered by scientific examination methods and when discovered, remedied, and this will do much to make the age of 60 and beyond fruitful, satisfying, splendid.

Dietary Dangers

Overweight and Carbohydrates

Overweight is not a major problem of old age. Fat men seldom live to be really old. Overweight is a problem of aging to which it has an important relation. Overuse of starches and sugar is the main cause of overweight, and overweight after the age of 25 shortens life. This is of national importance, for 28 per cent of all Americans are 10 per cent overweight, only 12.8 underweight. Overweight shortens life by adding burdens to the heart, circulation and the essential nutritional processing mechanisms. In addition it is the result of life-shortening body conditions, which is evidence of faulty food processing which deposits fat. It interferes with food utilization and causes excessive hunger and thirst, as in diabetes.

It adds many unnecessary miles of blood vessels through which the heart must pump blood. The physician nutritionist has therefore a

double duty, first to limit fat-producing food; second, to give the body aid in food processing.

In aging, the diet calories must be cut down. The decrease in natural activity from 35 to 60, calls for a reduction of fuel food. But even if the activity is the same at 60 as it was at 30 the basic caloric requirements have diminished 35 per cent. If caloric food is not diminished, weight increases, disability and death are hastened. Calories must be drastically reduced in the overweight aging men. (Can someone invent a low calorie candy bar?)

A comparison of the number of overweight men dying in any one year with the normal rate of death reveals striking facts. While 100 normal men are dying, 144 overweights die in the 15 per cent to 24 per cent overweight class. The greater the overweight, the worse it is, for those among 25 per cent or more overweight, 174 die.

In special groups the link of death to overweight is even more marked. Overweight diabetics will die at the rate of 257 against 100 normal weight deaths per year.

Lean men live longer, remain young, active, healthy and vital longer.

This is probably a life-long principle. McCay of Cornell has made a brilliant series of experiments with rats, covering their whole lifetime. Those rats that were kept on a low carbohydrate ration from earliest youth onward lived to an age corresponding to a human life of 100 to 150 years. They suffered less disease, were more lively and

vigorous and remained sexually fertile much longer than the "well-fed" rats.

This is a very attractive prospect and adds interest to the science and practice of dietetics applied to aging.

Cholesterol

Cholesterol is a complex chemical substance found in every living cell, abundant in the adrenal glands, brain and nerves. It circulates in the blood normally 100 to 200 milligrams per 100 cc.

Blood cholesterol varies with health, illness, food and circumstance. Cholesterol the "liver sterol" is one of the tetracyclic carbon group, like other sterols and sterones of this distinguished family. "Tetracyclic" means it has a nucleus of four carbon group rings linked together with atoms of carbon, hydrogen and oxygen attached to the free corners in singles and in groups.

Cholesterol is a scientific enigma. Although it is found in practically all tissues of all living animals, its function and role in life processes is not completely known. It resembles very much the more highly developed sterols and sterones. The male and female sex hormones, testosterone and estrone, and also the highly dynamic product of the adrenal gland cortex, "desoxycortico-sterone", may possibly be developed from cholesterol.

Cholesterol plays a varied and intriguing role in many life processes in youth and age, but it has a menacing association with aging and illness.

High blood cholesterol is found



Experiments on rats yield clues on prolonging human life.

in high blood pressure, hardening of the arteries and nephritis. Cholesterol deposits are found in the aorta near the opening of the coronary arteries in persons dying of coronary occlusion, "angina pectoris". Is it there for repair or is it merely a dangerous obstruction?

When patients are put on a low cholesterol diet, the yolk of eggs and butter eliminated, and animal fat, a probable source of cholesterol, reduced, some get better of their illness and their blood cholesterol is decreased. Some do not respond.

High blood cholesterol occurs also when the thyroid efficiency wanes, as it commonly does in aging. If the thyroid is supported by an ample biological diet and is fed a liberal supply of iodine, the illness may improve and blood cholesterol may diminish, or it may not.

If we feed some experimental animals a triple supply of cholesterol some may get deposits in their coronary arteries and some may not.

There is a promise and a menace in cholesterol. It plays a role in

health and disease in the dynamics of youth and the decadence of age. Research is going forward. Meanwhile we restrict eggs, butter and animal fat in the diet of most of the aging and we know that good is done.

Thus we have briefly discussed the dietary dangers of a too high carbohydrate diet and the suspicion and experience that lead us to reduce the intake of fats.

Of these things let the aging man be wary and be guided by the advice of science and the physician. The physician in turn is guided by his knowledge of nutrition on the one hand and his knowledge of the man for whom he prescribes. This is gained by personal study of the man himself as follows:

The Personal Nutritional Survey Record

The provision of proper diet and dietary supplements depends upon the diagnosis of malnutrition. A general survey of method of malnutrition diagnosis is herewith given. In this connection it is wise to remember that most men of 60 have from one to six or more diseases or deficiencies in some form or degree and yet may claim to be in fairly good health, only, "just getting old". The imperfections and scars of a lifetime fight against wear and illness must be reckoned with.

Generalized dietary standards are essentially theoretical and must never be used as a prescription to any one individual but only as an essential guide and point of departure. There is no wholesale

prescription to be blindly used by any man of 60. The individual must be examined, tested and known before his nutritional needs are met. The best service combines nutrition with all other forms of medical care and health guidance and the results are often surprisingly satisfactory. But the nutritional survey of the man of 60 takes time, work, insight, science and good clinical sense.

An outline of the essentials follows:

Record

1.1 Food intake — Record of food actually eaten and drunk recorded punctiliously mouthful by mouthful, day by day, by kind and by quantity, written down for seven days in a blank book furnished to the patient. This information is hard to get. There should be recorded any foods distasteful or cause of trouble or foods omitted by recommendation, or special diets given or foods especially recommended. In addition should be recorded the number of hours of work and sleep, medicines taken, especially laxatives, cathartics, antacids, minerals, vitamins, mineral oil, over-weight tablets, and use of alcohol and tobacco.

This record is an essential part of every thorough medical or health examination or survey of the man of 60 or any other age. This is basic to the interpretation of all the laboratory tests and clinical observations which follow as well as the nutritional program to be developed for each patient individually.

1.2 Birth place and racial stock

—Record of place of birth and residence may reveal significant nutritional body habits, trends and presumptive deficiencies—for example, lack of iodine in the Mississippi Valley and Switzerland. Geographical dietary folk ways affect individual nutritional patterns. For example, the use of wheat and beef in Western Europe; herring in the North; lamb, honey and buckwheat in South-eastern Europe; rice and soybean in Asia; yellow maize in Central America; etc.

1.3 **Illness**—The personal record of illness; sustained, recovered or continued. Damages and disability as affecting nutritional status and competence.

Examination

2.1 **Reported symptoms** by the patient commonly found in poor nutrition, viz, anxiety, headache, irritability, discomfort, dizziness, loss of appetite, depression, dyspepsia, fatigue, loss of sleep, nervousness, loss of interest in work or play, mental confusion, palpitation, shortness of breath and weakness.

2.2 **Physical signs of nutritional deficiency**—eye; conjunctiva, keratosis, etc., retinal changes, vision and night vision tests, mouth; gums and teeth, face; corners of mouth, skin; of nose, ears, forehead, body, heart action; nervous and digestive disturbances; psychoses; genital region lesions; hemorrhage; jaundice.

Laboratory Reports Nutritional Field

3.1 X-ray of bones and gastrointestinal tract, etc.

3.2 Micro assay and routine tests of blood and urine and basal metabolism.

3.3 Physiological tests—*Intake*—effects of *changes* in food intake, deprivation, tolerance and excess and stress tests for example, sugar tolerance.

3.4 Physiological tests—*Processes*—food digestion, normal basic processing, absorption and excretion.

3.5 Therapeutic tests — Response to *treatment* by food, vitamins and medical therapy.

Physiological Survey

A complete general physiological survey. Every organ is first tested at normal physiological load and next under experimental stress with special reference to nutritional factors. "Stress tests" are of greatest value. They place the organ under a load corresponding to the future wear and stress of 5-10-20 years and seek to read a prophetic index of durability and efficiency and to derive guidance therefrom.

Pathological Survey

A complete general pathological survey—signs of illness—past and present. This is a customary procedure of usual medical examination. "Signs of illness to come" is in the health examination field and far more difficult.

In our experience, illness, past and present, is always an essential consideration in the nutritional program of the aging.

Application—Prescription—Service

Assembly of data, interpretation and preparation of program follow:—and a continuing medical care and service through the years and decades is instituted under the best conditions. This is the ideal. It is recommended to scientist, physician, educator, legislator and the people at large.

Summary and Conclusion

This is a survey of the relation between diet and age, nutrition and aging.

It is written from the standpoint of the clinician interested in youth at every age on the background of the excellent scientific research data of the day. The author acknowledges his indebtedness espe-

cially to the staff members of the College of Physicians and Surgeons, Columbia University, Montefiore Hospital, Cornell University, Massachusetts Institute of Technology, Mt. Sinai Hospital, United States Public Health Service, to the helpful and alert research men of the purveyors of food and medicine and the authors and writers of textbooks and articles on geriatrics and gerontology whose views he has sought to transmit and apply to the service of aging men and women.

Much old age is unnecessary. Good diet is part of the newer scientific plans for the defeat of aging and the continuance of youth and vigor beyond our present expectation.

Nutrition for the Aged

By Dr. Clive M. McCay

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NO PANACEA or pill that can be swallowed is known that will transform the declining years of life into those of youth. Deep within the thinking of many men, however, is the wish and possible hope for a dietary regime that will counteract the carelessness of a lifetime, not only in regard to food habits but in disregard of ways of life. Few people in their declining years are willing to beg the pardon of their stomach and their whole body for the many years of carelessness and insult.

No student of nutrition has the slightest hope that he will live to see any dietary treatment that will cure the degenerative diseases of old age. However, few would question that ways are being devised for alleviating these diseases.

The outlook in the field of nutrition is never too bright. This would seem to be a paradox in an age in which the science of nutrition is advancing at a rapid rate. Within our lifetime more basic knowledge has accumulated than in all past time.

Practice, however, does not keep pace with this rapidly growing body of knowledge. The average person knows little of the facts and has his mind filled with a weird assortment of part truths and misinformation. This condition is due in part to the inaccessibility of technical knowledge about foods and in part to the deliberate

spread of misinformation by those who sell products of questionable nutritive value.

During the later years of life the dangers of malnutrition become even greater. Older women are prone to do less in the preparation of food and lean more heavily upon processed items. Habits are liable to become fixed and the older person gradually restricts his diet to fewer and fewer items while rationalizing that others are not good for him. Thus he is constantly eating a more limited variety because he says "given foods produce acid." Our generation will probably base our decreasing list upon grounds of allergy.

Furthermore, older people usually face far smaller incomes and these have a regular shrinkage in buying power in a period of rising prices. Food appears to be the easiest method to economize. The sense of insecurity may cause those with incomes that are modest but adequate to become very frugal in food expenditures.

As we view this picture, the danger of malnutrition is evident as the older person tends to live upon a few foods in very restricted amounts. Furthermore these foods tend to be processed and to be carbohydrate in nature since such foods are the cheapest.

Bread for the Aged

To scrutinize this situation one can take a food highly acceptable

to most older people, namely bread. Nutrition students have fought the processing of flour and the deterioration in the quality of bread for a century. At the same time they have observed the modern Russians fighting a modern war with their chief article of diet consisting of dark breads baked from flour subjected to little processing.

Today this concern over the quality of our breads is further increased by the recent studies of Mellanby.¹ He has found that puppies fed flour treated by one of the improvers, namely nitrogen trichloride, start having fits after a few weeks. We have no knowledge of what such flours do to man but the danger of older individuals basing their nutrition upon a highly processed modern food is evident. The welfare of all people and especially that of the older group may well depend upon the quality of some single item such as flour. How can we make sure that the quality of such products is maintained? Even if Mellanby's work is ultimately found to be erroneous, no nutrition student interested in the welfare of the aged will advocate any other bread than that made with flour of the greatest possible natural nutritive value.

Furthermore in the interests of the aged as well as the general public it is important that the wrappers of all baked goods state the amounts of ingredients used in preparing the product. Thus the nutritionist will have some means at his disposal for insuring and evaluating the quality of the diet of the aged.

In addition to a regular evaluation of the foodstuffs most acceptable to the aged, there is need for constant education of those in the latter half of life to induce them to broaden their food likes rather than to increase the number they dislike. Stieglitz² has emphasized the importance of training people for life during the latter years just as we train children to live as adults. In the program of training children we devote considerable attention to food. For older people this training is probably more important than for the child. Association with people tends to broaden the food selection of the child and adult. Furthermore this is an age of hunger and vigor. Quite the opposite is the case in the later years with more enforced isolation and less exercise and hunger.

Institutional Programs

In programs that institutions are now creating to help their retiring members live well in the later years there is certainly as much or more need for nutritional education as for that concerned with investment of money.

Older people living in institutions are not so liable to restricted diets as those living alone. However there is great need for reviewing the diets of these institutions. From the techniques devised by the Navy³ during the war for the evaluation of food served their men have come methods that can be used with slight modification for evaluating the food served those in any institution.

Inasmuch as budgetary allow-

ances for such institutions may be more severely restricted than they ever were for the Armed Services, such checks of the nutritive value of foods consumed should be made at intervals of about six months in all larger institutions feeding older people.

The proposal to deliver ready cooked meals to aged people living alone has recently been made in London. Such a program should lead to better nutrition and the consumption of a wider variety of foods. This British proposal was made in the interests of reducing the load upon hospitals by 10 to 15 per cent. They estimate that this many beds are occupied by those who primarily need rest and better food.

Evaluation of Diets

In any program for improving the nutrition of older folks there is need for evaluating the foods actually consumed. In cases of group feeding it has already been noted that the naval methods can be applied. For older individuals living in families or alone, however, accurate methods for measuring foods consumed must be devised. There are grave doubts about the accuracy of data derived from surveys by means of questionnaires. Few individuals are accurate in noting what or how much they eat. Certainly this accuracy would not increase with age. In severe questioning of one man who has made rather extensive use of such methods he finally "guessed" but did not know that his accuracy might have been 20 per cent.

Any nutrition student should be able to evaluate the food consumed in her community by a representative group of older people if a modest fund is available for the purchase of sets of scales commonly used by dietitians. After some simple lessons in weighing and recording amounts of food eaten it should be possible for an older person to evaluate current nutritional values of foods consumed with the help of the teacher to do the arithmetic.

With such data available in many communities and in various social strata it would be possible to evaluate needs in terms of nutritive values of foodstuffs, money for the purchase of foods and the content of courses taught for the benefit of adults. Furthermore such information would be of great use for determining whether or not educational methods were proving effective in changing food habits. Today great effort is being expended by numerous organizations to teach better nutrition to both children and adults. However almost nothing is known concerning whether or not this teaching is bringing results. Work with the older people might well blaze the way for nutritional studies by individuals in other age groups.

Animal Research

The modern science of nutrition has been created during the past century by thousands of experiments upon rats, dogs, mice, chickens, monkeys and guinea pigs. Most of this research has consisted of short time experiments involving drastic shortages of some

essential such as protein or a given vitamin or mineral. Under such conditions of acute nutritional deficiency the animal is brought to the doors of death and revived by a suitable supplement. Thus the biochemist discovered essential fatty acids, vitamins, amino acids and inorganic elements.

For the most part such research has been in the hands of the chemist who has had little interest in, or knowledge of pathology. Hence careful pathological studies in relation to nutrition have been the exception until relatively modern times. Furthermore much of the nutrition research has been concentrated in agricultural colleges because it has had support there. Pathologists are still rather rare in such schools.

This brief introduction stresses the need for attention to another type of nutrition which may lead to a partial solution of the difficult problems involved in the improvement of well being during the later years of life.

Research in this field involves long time experiments with animals. Deficiencies, if they are to resemble those of human beings, must be borderline and long continued instead of drastic ones for short periods. The species of animal that can be used is limited because the species selected must pass from youth to old age in a few years. If elephants or turtles were used for such studies there would have to be three generations of scientists in service. The grandfather would initiate the study and the grandchild terminate it in his old age.



Experiments on dogs may have important bearing on extending life.

In such research the nutrition student who is usually a chemist must have the cooperation of the pathologist. One controls the diets fed the animal and the other evaluates the diseases that develop. As this science of gerontology develops the importance of other disciplines will probably appear even more essential than they do today. No doubt the geneticist will have an ever increasing part in studying the interrelationship of breeding, diet and pathology.

Likewise the toxicologist will come into the picture. He will be asked "What is the effect upon the life span of an animal if it is fed from youth to old age upon a flour bleached with nitrogen trichloride?". The student who specializes in environment will also take part. His variables will be light, heat and humidity.

With this introduction to the methods of attacking the nutritional problems of later life, it may be worth reviewing briefly our studies of the past 19 years.⁴ For

most of these we have used white rats because they pass from youth to old age in about two years. The nutrition of this species resembles that of man sufficiently that the rat has contributed to many basic discoveries.

In three long experiments covering a period of more than 12 years, attention was centered upon the inter-relationship between rate of growth and rate of aging. All of these studies indicated that the life span of the rat was greatly extended if it were obliged to grow slowly by restricting it to a limited amount of a high quality diet. Whereas it is very difficult to maintain rats, especially males, to an age of 1000 days when growth to maturity is rapid, it is easy to produce substantial numbers that live to an age of 1200-1400 days by this technique of retarding the growth rate.

The question arises concerning the value of such results in the field of nutrition since the method obviously is not useful in application to man or domestic animals at the present time.

These results, however, open new horizons in several fields. In the first place they indicate that the prolongation of the life span and the maintenance of many youthful characteristics through control of one variable, the diet, has been accomplished. Therefore this achievement is not a dream or a "pot of gold at the end of the rainbow." Once achieved it may be possible that life and youth can be extended in other and more practical ways.

In the next place these studies

place a premium upon keeping the body thin. Human experience has long taught this, especially in this era of life insurance, but thousands of men and women still do not appreciate that pounds of extra flesh must be paid for by fewer years on this earth. Thus it is evident that overnutrition at least in calories can be antagonistic to the well being of the animal body just as much as deficient nutrition.

Finally the early observations by ourselves and the later ones in cooperation with Dr. John Saxton⁵ all indicate that low calory diets and retarded growth profoundly modify the time of life in which certain diseases will appear. Here again we rediscovered what was already known early in the present century, namely that even such deep seated changes as those involved in the development of tumors are profoundly modified as the result of slow growth forced upon the rat by low calory diets.

Today there is no means of applying these observations to the control of cancer but they afford clues and methods of experimental approach to the problem.

In the course of these labors it has become evident that the rat has great limitations for research in relation to aging. Even the oldest rats seem to develop few pathological changes in the heart and arteries. Furthermore in contrast to man the rat's most vulnerable organ is its lungs. Early in life it tends to acquire a chronic bronchiectasis which places great limitations upon it for studying such factors as exercise in old age. The functioning

tissues of the lungs of old rats may be adequate to support a quiet life but the animal will perish if pushed beyond the capacity of this limited tissue. Thus some years ago a laboratory concluded that exercise in old age was harmful because their old rats died prematurely when forced to run. They failed to even examine the lungs of the rats that perished.

Numerous studies have been made with rats maintained upon given diets throughout the span of life. Most of these have given disappointing results for human application. However they do teach modesty in regard to the very limited knowledge about nutrition.

Some years ago we ran studies with several groups of rats to determine if the maintenance of thin bodies during the latter half of life would influence the total span. Some rats were kept thin after middle life by being forced to run in a rotating barrel: others were restricted in food after middle life. A third group was allowed to fatten as they desired. The two thin groups outlived the fat one. Either method of keeping thin seemed favorable.

In one series of experiments all rats were fed an adequate amount of high quality basal diet with additional calories provided to four different groups in different forms. Thus one group received its calories as liver, another as milk, another as starch and a fourth as sugar. No differences were found in the total span of life indicating that these sources of calories were of little concern if the basal diet were adequate.

In studies in progress during the past four years and now completed⁶ we divided a large number of rats into three groups. One was fed a diet of human foods mixed in the proportions consumed in the north-eastern part of our Nation. Another was fed this same diet supplemented with some of the widely used and concentrated vitamins. A third group was given the diet "improved" by the inclusion of more organ meats instead of muscle, more milk and more whole wheat bread. Finally each of these three groups was divided into halves. One half was allowed a moderate amount of fresh coffee each day equal to a cup or two for man. The other half had only water to drink

The results of this recent study afforded no evidence for favorable effects of the two "improved" diets. The New England diet was not improved as far as the life span of the white rat can serve as a criterion. Of course this is evidence with extreme limitations since we have no evaluation of the quality of the life within the bodies of each of these rats in the various groups.

The variation in the span of life as a reflection of the consumption of coffee was not marked. In two groups the differences were significantly favorable. This exploratory research was followed up by studies in which small groups of rats were allowed no water to drink but only coffee from the time of weaning. This study was continued through two generations of rats in order to cover gestation and lactation. No unfavorable effects were found.

The most recent studies of the long continued use of a dietary are those reported from von Euler's laboratory in Stockholm.⁷ He compared the life span of one group of rats deriving most of their fat from margarine with a similar group fed butter. No differences were discovered and he concluded that butter and margarine were equal in value. His studies are interesting because the diseases that developed and terminated the lives of his old rats were similar to those described previously in American and British laboratories. These indicate that rats in widely separated laboratories die with similar terminal diseases and have about the same mean span of life.

Summary

During the later years of life poor diets are liable to be consumed because of limited funds, undue frugality, increased food costs, less interest in cookery and severe restriction in number of food items selected. The importance in high quality in such foods as bread increases since more of such prepared foods are consumed and the variety in the diet is decreased. The recent studies of Mellanby in-

dicating dangers from the use of common bleaching agents on flour indicate the need for scrutinizing all highly processed foods consumed by the aged.

Techniques for evaluating the food ingested by older people are now available for both institutions and individuals. These should be used to determine quality of diets and the effectiveness of teaching programs. Definite attempts are needed to prepare people to eat proper foods during their later years in order to increase variety. The proposed British plan to deliver cooked food to aged individuals in London in order to relieve hospitals may have merit for larger cities.

Extensive animal research in the form of long time studies is needed to guide practices in human nutrition. Research using rats and carried on during the past two decades indicates unique possibilities not only in formulating better diets but in preventing some of the common diseases such as cancer in old age.

Human experience and animal research unite in indicating that overeating may be destructive to human life just as well as underconsumption of essential nutrients.

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Maternal Nutrition in the Public Health Program

By Dr. Edward R. Schlesinger and Miss Harriet Stevens
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THE ROLE of nutrition during the prenatal period has undergone critical reevaluation during the past decade. Prior to that time nutrition of the pregnant woman was treated as a minor factor relating to her health and to the condition of her offspring. When attention was given to diet, it was often from the viewpoint of overcoming or preventing specific conditions such as constipation. Maternal nutrition was frequently neglected completely because of an all too prevailing view that the unborn child was merely a parasite which took unto itself all necessary nutrients from the body of the mother. This view held the infant at birth would not be affected by the nutritional status of the mother except in the presence of starvation.

The developments leading up to the dramatic change in attitude are of interest. In the middle nineteen thirties a sudden break occurred in the level of maternal mortality in the United States. By 1946 only one-fifth the rate of maternal deaths was recorded as compared with 10 years before. Among infants under one year of age the death rate has shown a progressive drop over a much longer period, but the rate of still-births and deaths among infants under one month of age did not decline until after the drop in ma-

ternal deaths was first noted. These general trends have been presented merely to point out that continued declines in maternal and infant mortality will be increasingly difficult to attain and that intensive use must be made of advances such as in the field of nutrition if further progress is to be recorded.

Recent Studies

Several fairly recent studies have indicated that women having good or excellent diets are in better general physical condition during pregnancy and at the time of labor and have fewer complications of pregnancy than do women on inadequate diets. One specific study, for example, has shown that women suffering from even moderate degrees of anemia during their late prenatal period have a lower resistance to infections and show a greater tendency to complications involving such infections following delivery. Among the more impressive investigations carried out in this country, Canada and England are those in which supplements of essential foods have been given to groups of women on previously inadequate diets, keeping parts of the groups as controls. Here again, women on a better diet because of the supplements appeared to be in better physical condition and to have fewer complications of pregnancy.

The health of the offspring may also be profoundly affected by the diet of the mother. Evidence now accumulating suggests that women who have had outstandingly good diets during pregnancy are more likely to have healthy well-developed infants who have a great advantage in overcoming the hurdles of the newborn period. Other studies have indicated that women who have had good diets have less difficulty in nursing their infants.

In the studies mentioned, careful medical examinations failed to reveal clinical evidence of nutritional deficiencies even among the women on the poorest diets. Therefore no reliance could be placed on signs or symptoms of deficiency diseases in the evaluation of the nutritional status of the expectant mother.

Criticism has been directed at some of the studies on maternal nutrition on the ground that a comparatively small number of individuals have been studied and also because of the difficulties encountered in reducing certain aspects of the studies to an objective basis. Nutrition in the human being is but one of many factors affecting the health of the individual. Those very factors which are so difficult to separate from nutrition such as housing, clothing, exposure to infection and educational status, tend to vary in the same direction as nutrition. Even in the most easily controlled type of study in which dietary supplements are utilized unexpected difficulties arise. For example, it may be impossible to evaluate the psychological effect of supplementation of her diet on the pregnant woman in in-

creasing her self-confidence, thereby reducing the element of fear which has been shown to be a common cause of difficult labor.

Diet During Pregnancy

Nonetheless the evidence which has been summarized is impressive in indicating that maternal nutrition is indeed important and that it has many practical implications. Application of this knowledge cannot await evidence controlled scientifically to the nth degree. In this situation one is concerned with the health and welfare of innumerable individuals who are peculiarly deserving of the benefit of any doubt in the improvement of their health. The improvement of maternal nutrition has no adverse effect and the weight of reasoned evidence indicates that many benefits in terms of health will be reaped.

The recommended allowances of food nutrients as set up by the National Research Council are generally recognized as providing a factor of safety beyond the bare minimum needed by the normal adult. Nutritional needs during the first half of pregnancy may be met if these allowances are obtained. The suggested amounts daily from the following food groups should assure the selection of an adequate diet: one pint of milk, one egg, one medium to large serving of meat, one medium-sized potato, two servings of vegetable, one to be yellow or green, two servings of fruit, one to be citrus fruit or tomato, one serving of whole grain or enriched cereal, three

slices of whole grain or enriched bread, and two tablespoons of butter or fortified margarine. Other foods should be selected as desired to meet the caloric needs of the individual. It is considered advisable for the pregnant woman to use iodized salt to assure an adequate intake of iodine. Supplementation of the diet by a concentrated source of vitamin D such as cod liver oil is also generally recommended.

To meet the requirements of the latter half of pregnancy, it is necessary to include the following additional foods in the daily diet: another pint of milk, another serving of citrus fruit or tomato, another serving of green leafy vegetable, and another serving of meat or a serving of fish, cheese, or beans. An essential contribution is made to the diet by the substitution of a serving of liver for a serving of meat once a week.

A Suggested Program

The public health nutrition program seeks to spread this knowledge of maternal nutrition, so that it will reach every individual in need of it. It has been repeatedly emphasized that pregnancy is a highly teachable period. Knowledge gained and habits acquired at this time carry over after childbirth and also exert a marked influence upon family food habits. Education given in general terms is of comparatively little value. Material must be brought to the pregnant woman in a form compatible with her economic level,

family food habits resulting from her cultural background, and local availability of foods. Patients in prenatal clinics are often most in need of assistance but patients under the care of private physicians must also secure the benefits of nutritional guidance.

In more specific terms, a service must be developed which will permit evaluation of the diet of each pregnant woman as early in pregnancy as possible. Instead of general dietary advice, specific advice must be directed to the deficiencies disclosed by this individual evaluation. It does not appear likely that there will be a sufficient number of nutritionists trained in this field to provide the service directly to the extent needed for many years to come, even if it is shown that such direct service is an economically sound method of utilizing the nutritionist's training. For the most part, the physician, the clinic nurse, the public health nurse, and other professional personnel who come in contact with the individual patient must take over the basic responsibility for this work. However, a sufficient number of highly qualified nutritionists must be made available through State and local departments of health and through voluntary agencies in the field to assist in planning the details of the program and for guidance in difficult individual situations. Through such practical means will the recent advances in the knowledge of maternal nutrition be applied in all parts of the State.

Nutrition and Child Health

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THE STATUS of childhood indicates not only emergence from infancy but also a milestone in the direction of the manhood and womanhood of the future citizens of the State. Each step toward maturity is basically dependent on the nutrients supplied during each preceding stage in development.

The newborn infant, for example, is the product of food elements furnished to the fertilized ovum by the mother. It is obvious, therefore, that the structure of the infant may be optimal if these nutrients are supplied quantitatively and qualitatively in adequate amounts during fetal life. Conversely, one would expect that quantitative and qualitative deficiencies of nutrients supplied to the fetus might result in structural and physiological deviations from normal.

In appraising the present health of a child, therefore, it is often desirable to obtain a history of what has transpired in the life of the child, not only from birth, but also during fetal life. The preconceptional health and nutrition of the mother and her health and nutrition during the parental state often give valuable information regarding the health of the infant or child during the formative or fetal stage of development. One can, thus, often appraise the present status of an infant or child by carefully analyzing his or her nu-

tritional status during each stage of development. It is well known that certain nutritional deficiencies have effects on the individual lasting throughout life. It is possible, therefore, that many abnormal conditions that are observed throughout childhood had their beginning during fetal life and were primarily the result of poor nutrition of the mother.

Diet and Pregnancy

A number of investigators have shown that a poor diet during pregnancy is not only detrimental to the mother, but also has harmful effects on the infant. Ebbs and associates found that during the first two weeks of life, the condi-



Building right food habits in pre-school child means good food habits later in life.

tion and progress of the offspring of mothers who were poorly nourished was poor or bad in 14 per cent of the cases, as compared to none who came from mothers who were well nourished. They noted that during the first six months of life there was a definite increase in the incidence of bronchitis, pneumonia, anemia, and feeding difficulties among the babies of poorly nourished mothers as compared with those of well fed mothers. Tetany and rickets were not noted in the offspring of well nourished but were present in those of the poorly nourished mothers.

Burke and associates found that 67 per cent of the infants born to mothers whose general dietary ratings were "poor to very poor" were stillborn, died within three days of birth, had congenital defects, were premature or "functionally immature." Twenty-eight per cent were considered in "fair" or "poor" condition and only 5 per cent were in "good" or "excellent" condition. Actually all but one infant, in the series of 216 cases born to mothers with "good" or "excellent" diets during pregnancy, were in "good" condition at birth, while only two infants born to mothers with "poor" to "very poor" diets during pregnancy were in "good" condition at birth. Although the "fair" to "very poor" diets in the foregoing studies were found to be deficient in several essential nutrients, they were generally found to be consistently low in protein.

Protein Is Basic

It must be admitted that an ade-

quate, well balanced diet is desirable for growth, development, and adequate functioning of the body. We cannot overlook the fact that the basic foundation of the diet, as of the body, must consist of protein. As its Greek root implies, protein is of first importance.

Protein not only is the most important constituent of the protoplasm of the body, but it is necessary for the formation of all living cells. It is required for the synthesis of body protein, plasmaprotein, hemoglobin, hormones, and enzymes, as well as the formation of secretions, such as milk. Adequate protein intake is necessary to form enzyme systems from vitamins. Protein is concerned with immunity, antibody formation, osmotic pressure, colloidal action, and specific dynamic action. It is capable of supplying energy to the body and participating in the detoxication of exogenous and endogenous toxins.

Protein, especially animal protein, is the most expensive food substance and during inflation and depression protein of animal origin is unobtainable in significant amounts by all people because of diminished purchasing power. In time of war, it is not only expensive but scarce. Under such conditions protein deficiency states are probably more prevalent than is generally realized.

When protein is deficient in the diet, one would expect to find disturbances of many physiological processes in the body and for the possible development of pathological states. There may be, moreover,

not only a protein deficiency per se but secondary effects resulting from the inability of the body to properly utilize vitamins and minerals, and also interference with the normal function of the endocrine glands. The thyroid gland, in particular, is apparently adversely affected by a deficiency of protein since a state of hypometabolism is often present. Diminution in size and secretory activity of the thyroid gland was particularly emphasized by those who studied nutritional edema in Europe in 1918. Some of the symptoms and signs of protein deficiency are strikingly similar to those observed in hypothyroidism, viz, low basal metabolic rate, hypotension, hypothermia, etc.

Interrelationships between the thyroid gland, and other glands of internal secretion, and vitamin metabolism have been shown to exist. There appears, also, to be a parallelism of the symptoms noted in dietary deficiency states with the symptoms produced by an imbalance of the vegetative nervous system. It does not appear to be a coincidence that many of the symptoms of protein and vitamin deficiency, thyroid dysfunction, and vegetative nervous system imbalance are similar but rather it seems that an interrelationship does exist. This interrelationship appears to be a factor in producing a symptom complex that will now be considered.

Clinical Observations

Although I have advocated breast feeding for many years, I have found it increasingly difficult

for mothers to nurse their babies at the breast despite the fact that they were willing and anxious to do so. Inquiry has usually revealed that many of these mothers have subsisted on an inadequate protein intake during and after their pregnancy. Although they are supplied with additional quantities of vitamins, calcium, and iron during pregnancy, some of these mothers show signs of vitamin deficiency and anemia.

The offspring of many of these mothers whose diets are deficient in protein are small at birth, at times premature. They often thrive poorly during infancy. Some of the infants gain rapidly in weight and become excessively large for their age. Umbilical hernia and undeveloped genitalia are commonly observed. Retarded dentition and signs of rickets are often noted. Respiratory infections are common. Many babies sleep poorly, are colicky or irritable.

Among those beyond the age of infancy a symptom complex has frequently been observed in cases that give a history of a deficient protein intake. These children fail to respond significantly to supplementary vitamins although signs of vitamin deficiency are often present. However, when the protein deficiency is corrected, the response to vitamin preparations is more evident.

Although some of the children are underweight, there are many who are of normal weight or overweight, according to accepted standards, but who manifest similar signs of deficiency.

Frequent and prolonged infections involving the skin, mouth, or respiratory tract has been noted in many of the children that have been mentioned.

A mother will occasionally point out that her child falls easily, or that he or she appears to be clumsy. One such case led me to suspect a brain tumor but the child's symptoms responded to dietary supplementation. There is at times a history of injuries from relatively minor causes and there is often delayed healing in these cases.

The nervous system of many children patients that have been seen has apparently been definitely affected by a diet that is primarily deficient in protein. Many of the children are irritable and restless. Biting the fingernails is frequently observed. Some of these patients "go to pieces" if the mother or teacher corrects them. Many times the complaint is that the child will not sit still.

There are children who will not readily go to sleep, and others who wake up frightened; some are restless in their sleep.

There are complaints of fainting or dizziness. Some of the children tire easily or lack ambition. Others are retarded in their school work. Some complain of frequent headaches. Abdominal pain and constipation are often noted, and at times there are digestive disturbances.

A number of children have vague pains in the extremities which often give the confusing picture of rheumatic fever. In some cases there is precordial pain.

It has been observed quite often that children receiving diets defi-

cient in protein have frequency of urination. Some have nocturia or enuresis. Vaginitis is commonly observed in girls.

The physical examination of many of these children often reveals the presence of puffiness of the eyes. This manifestation does not appear to be a true edema. In some cases there are dark circles beneath the eyes.

The skin often shows a definite pallor; less frequently there is a pale lemon color present. The postures are often poor and the muscles are flabby. Some of the children have rough skin and coarse hair; others have lesions on the feet resembling burns or epidermophytosis.

The teeth of many of the children are found to be carious, and it is noted in some cases that recent dental work has been done. A yellowish discoloration is frequently noted on the teeth of many children, including those who apparently have sound teeth.

The tonsils in many cases are found to be hypertrophied or diseased; however, in some instances it is noted that the tonsils are out which would indicate that they probably had been hypertrophied or diseased.

Tachycardia or bradycardia is not infrequently present and low blood pressure is often observed. In some cases the temperature is subnormal.

Many of the children show evidence of having bitten their fingernails. Many of them have leukonychia (white spots) on the fingernails. This condition is frequently noted in states of thyroid dysfunction.

Malnutrition in School Children

During the school years 1945-1946, it was noted, during routine examinations, that many of the children frequently showed signs similar to those that had been observed in private practice. In order to correlate the puffiness of the eyes and the leukonychia (white spots) on the finger nails with the physical defects that were observed, these findings were recorded on each chart.

At the end of the school year, it was noted that of the 1,789 children that had been examined in four schools, 1,357, or 75.8 per cent showed physical defects.

Three of these schools included many children in the lower economic group; the fourth school included children of a higher economic status. The total number of children with physical defects who showed puffiness of the eyes was 514 and the number who showed puffiness of the eyes and leukonychia was 481. Those children who had physical defects with leukonychia alone amounted to 144 and those showing neither puffiness of the eyes nor leukonychia amounted to 218. Thus the children with puffiness of the eyes and those showing puffiness of the eyes and leukonychia ran almost parallel. Many of the children without physical defects showed puffiness of the eyes alone or with leukonychia, or leukonychia alone, yet the percentage was only 55 per cent as compared with 82 per cent in those children with similar signs who had physical defects. Studies are now being conducted to determine

during this school year how many of those with puffiness of the eyes, with or without leukonychia, and leukonychia alone, who had no physical defects last year will show evidence of defects this year.

When the figures that have been mentioned above are examined in detail and compared with the individual defects, it is found that the number of children with defective hearing, vision, tonsils, teeth, heart, nutrition, posture, and skin are approximately the same in the group with puffiness of the eyes alone as in the group with puffiness of the eyes and leukonychia. Thus there is a parallelism in the numbers showing similar physical defects in the group with puffiness of the eyes and the group with puffiness of the eyes and leukonychia.

Nutrition Studies in Ringworm Infection

At the beginning of the school year 1945-1946, it was noted that children with ringworm infection of the scalp frequently showed puffiness of the eyes and often leukonychia, together with a high incidence of physical defects. Since many of these children appeared to be undernourished and the widespread epidemic of ringworm infection throughout the United States seemed to run parallel with the rationing and shortages of food, it was decided to conduct an investigation with these facts in mind. Although ringworm infection has affected a relatively small proportion of the school children in Syracuse, yet, it has been a difficult disease to eradicate. It often requires up to two years or more

to combat it in the individual child with the methods of local therapy usually employed.

With the corroboration of Dr. Anne Bourquin, Professor of Nutrition, Syracuse University, and her assistant Emelia D. Mainello, nutrition studies were made on four children with ringworm infection of the scalp. A four-day dietary study was made on each child. This investigation of the diet revealed that each of these children had dietary deficiencies of several food elements, including protein, as compared with the recommendations of the National Research Council. All local therapy was discontinued in each of these cases and protein hydrolysate was given at school and in supplements at home. The diagnosis of the ringworm infection was made and the progress of the disease was followed by the Wood filtered ultraviolet lamp. Within 10 days, two of these children showed marked improvement in the ringworm infection. One child showed unsatisfactory results and local therapy was resumed; the fourth child was afflicted with rheumatic fever after the start of the study and he was absent for the remainder of the school year.

We were encouraged with these results and, therefore, began more intensive studies on a larger number of children with ringworm infection. One group was given protein hydrolysate and a liver-stomach concentrate; sodium iodide was given to a second group in addition to the customary diet; protein hydrolysate was prescribed for the third group; and the fourth group was given a balanced

diet fortified with supplementary vitamins to correct the dietary deficiencies indicated by the dietary studies.

The greatest amount of improvement in the ringworm infection was noted in the groups receiving protein hydrolysate. One child in the group receiving iodine internally made outstanding improvement. The results in the group receiving a diet balanced with natural proteins and supplementary vitamins were somewhat disappointing. We attributed this result to the fact that the protein deficiency had probably produced a disturbance in the digestion and assimilation and that protein in a form such as protein hydrolysate, which requires little or no digestive preparation, resulted in a more evident response than natural protein. The observation that the administration of internal iodine was effective in the treatment of one of our cases might imply that there was an iodine deficiency present.

Experiments, which have been conducted this school year on a small series of cases, appear to indicate that this implication may be justified. The success of local treatment of ringworm infection with tincture of iodine and other iodine preparations appeared to us to be the result of absorption and systemic action. The application of iodine to the area of the scalp affected by ringworm was, therefore, discontinued in five cases and applications of iodine were made on other parts of the body. The results in these children were comparable to those observed when

iodine was applied directly to the area of the scalp involved by the ringworm.

Our studies, though limited in extent, would appear to indicate that the nutritional status of a child influences the susceptibility and rate of healing in ringworm infection. It might, therefore, be assumed that the nutritional status of the child is playing an important role in the increased incidence of the ringworm infection which has been noted throughout

the United States since the onset of World War II.

The need for scientific nutritional studies, as well as a nutrition program to compensate for the inadequacies in the home dietary and, thereby, provide a completely adequate diet for the school child, is clearly indicated. When we realize the need for wider acceptance of these requisites, we will have healthier children as well as children who are mentally equipped to face the future with greater security.

Public Health Nutrition Clinics

By Dr. Norman Jolliffe and Dr. Elmer Alpert
Nutrition Clinic, New York City Health Department

NUTRITION services to the school child have been inadequate. This inadequate service largely stems from the "youthfulness" of the science of nutrition which up to World War II had not many of its findings proven by large scale demonstrations. However, World War II furnished the opportunity for large scale nutritional studies both at home and in the military services. From these studies it was proven that anything less than an optimum diet was inadequate to either build or to use the modern instruments of war.

It was further found that the simple instruction of "go to eat" was often as inadequate in solving the problem of an optimum diet as the resulting diet was deficient in specific nutrients. In other words, the individual could not be depended upon, even with adequate purchasing power with proper foods available, to select and eat an adequate diet. It had to be furnished to him so that proper selection was almost automatic. Thus sprang up the in-plant meals, the supplementary feedings, the vitamin and mineral enrichment of basic foods, and even the supplementary use of vitamins, as such.

At the same time, survey methods for detecting malnutrition were developed and enhanced. These have utilized mass and individual dietary records, chemical analysis of actual diets, micro-chemical methods for determining

the nutrient levels in body tissues and fluids, instrumental methods for detecting subgross tissue changes and finally improvements in the clinical examination, so that now many signs this side of florid deficiency syndromes can now be recorded, observed and in many instances interpreted.

These developments in the science of nutrition can be used to enhance the nutrition service to the school child in a variety of ways:

1. By providing a school lunch to every child, without cost to the child and without a "means" test. This school lunch should provide at least one-third and aim to provide one-half of the daily dietary requirement each day. This high figure should be supplied in order to make up for "at home deficiencies," and at the same time cultivate proper dietary habits and likes so that the child, when away from school and in later life will be more apt to select the optimum diet. Integrated with the school lunch should be classroom instruction in science and health subjects so that they are taught not as academic subjects but one of practical correlation.

2. The school health facilities should be expanded so that nutritional inadequacies can be detected and corrected before they progress sufficiently to impair the health of the child. To do this certain signs and symptoms of mal-

nutrition should be taught the teacher; these and others, to the school nurse; all these and still others should be common knowledge to the school physician. In the accompanying table are listed the signs of malnutrition, grouped according to systems, along with the deficiency or syndrome which these signs suggest. The school physician should be familiar with all. Those marked (T) should be taught to the teacher so that the pupils showing them could be referred to the medical office. Those marked (N) could be taught to the school nurse so that she could refer this additional group to the school physician.

3. The third point in expanding the nutrition services to the school child is the establishment of a "Nutrition Clinic" in the Health Department to which the school physician can refer these children. This clinic should be a preventive, a diagnostic and, for those desiring it, a treatment clinic. In this clinic four types of examination should be done:

- a. A thorough medical history and examination by a physician to detect other diseases and conditioning factors which may cause malnutrition even in the presence of dietary adequacy.
- b. A dietary history to detect unsatisfactory dietary patterns.
- c. A chemical and instrumental examination to detect unsatisfactory blood and tissue levels in several of the nutrients, and sub - gross anatomical

changes, not yet visible to the unaided eye.

d. A chemical nutritional examination to detect deficiencies already present.

If the child's family has a private physician the results and recommendations should be communicated to him. If not, the clinic can properly take over the nutritional supervision.

The Nutrition Clinic I describe is one established in March, 1945, in the Department of Health of the City of New York. Since that time 1945-1946 a total of 817 patients have been examined—600 being school children.

There are many questions I cannot as yet answer concerning our experience, as the records are now being coded for the correlations of history, dietary analysis, chemistries and clinical findings. However, we are observing many patients manifesting clinical signs of many nutrient deficiencies.

This finding indicates that the Nutrition Clinic is getting sufficient material to represent "pay dirt" for the nutrition scientist, and to serve as a teaching center for physicians interested in observing, studying and treating the earlier signs of malnutrition.

It is our belief that we are not getting many of the worst cases of malnutrition in the school system. Visits to the schools and routine inspection of the children in the schools bear this out. One reason for this is the unfamiliarity of the school physician with many of the signs of early malnutrition. It is also due to the fact that sufficient

fact finding surveys in the various schools have not been made thus calling attention to the school

physicians and school health authorities that such things really exist in significant numbers.

TABLE I
Signs of Malnutrition

System	Finding	Suggested Deficiency or Syndrome
GENERAL.....	Underweight (T)	Calories, protein, calcium, phosphorus, vitamins
	Underheight (T)	Iron, folic acid, ascorbic acid, thiamine, B-complex
	Pallor (T)	Unknown
HAIR.....	Dry, staring hair, usually with pediculi (N)	Ascorbic acid, unknown
SKIN.....	Perifolliculosis (N)	Vitamin A, unknown
	Folliculosis (N)	Vitamin A, unknown
	Xerosis (N)	Niacin
	Dermatitis of Pellagra (N)	Riboflavin, unknown
	Erythematous	Niacin, riboflavin, unknown
EYES.....	Intertriginous	Unknown, riboflavin, pyridoxine, vitamin A
	Hyperkeratotic	Unknown
	Ichthyotic	Unknown, B-complex, riboflavin, amino acids
	Dyssebacia, especially in nasolabial folds, external canthi, behind ears and and in body folds (N)	Unknown
	Intertrigo (N)	Ascorbic acid, vitamin K, Unknown
	Acne (T)	Unknown, vitamin A
	Acne vulgaris	Unknown, riboflavin, tryptophane
	Acne Varioliformis	Unknown, riboflavin
	Palmar erythema	Unknown, riboflavin
	Spider telangiectasis	Vitamin A
LIPS.....	Suborbital pigmentation (T)	Niacin
	Hemorrhagic manifestations (N)	Unknown, vitamin A, riboflavin
	Xerophthalmia	Riboflavin, unknown
	Corneal vascularity	Vitamin A
	Circumcorneal injection	Vitamin A, riboflavin
	Rosacea keratitis	Riboflavin, B-complex, pyridoxine?
	Follicular conjunctivitis	Unknown
	Scarlet conjunctivitis (T)	Riboflavin, B-complex
	Blepharitis (T)	Riboflavin, B-complex
	Canthi fissures (T)	Riboflavin, B-complex
TONGUE.....	Night blindness	Riboflavin, B-complex
	Photophobia (T)	Riboflavin, B-complex
	Cheilosis	Riboflavin, B-complex
	Chapping (N)	Riboflavin, B-complex
	Increase in vertical fissuring	Riboflavin, B-complex
	Atrophic cheilosis	Riboflavin, B-complex
	Angular stomatitis (N)	Riboflavin, B-complex
	Angular fissures (N)	Riboflavin, B-complex
	La Perleche (N)	Niacin
	Scarlet red glossitis (N)	Niacin, B-complex, folic acid
HAIR.....	Beefy red glossitis (N)	B-complex, riboflavin
	Magenta glossitis (N)	Niacin, folic acid, B-complex, Addisonian Pernicious Anemia, unknown
	Chronic deficiency glossitis (N)	Niacin, unknown
	Edema of the tongue (N)	

System	Finding	Suggested Deficiency or Syndrome
ORAL MUCOUS MEMBRANES	Scarlet stomatitis (N) Lichen planus Leukopakia	Niacin Unknown Unknown
TEETH and GUMS	Caries (N) Meloocclusion (T) Scorbutic gums (N) Gingivitis	Unknown Vitamin D, unknown Vitamin C Vitamin C, unknown
SKELETAL.....	Rachitic deformities (N) Osteomalacia	Vitamin D, calcium, phosphorus
NERVOUS.....	Nutritional polyneuropathy Retrobulbar neuritis Central ophthalmoplegia Encephalopathic states	Vitamin D, calcium, phosphorus Thiamine Thiamine, unknown Thiamine Thiamine, niacin, B-complex, unknown
CIRCULATORY.....	Combined system disease Organic reactive psychoses Beriberi heart disease Edema (T)	B-complex, folic acid? Thiamine, niacin, B-complex, unknown Thiamine Protein, thiamine, famine



—USDA photo by Knell
Youngsters need the lunch program for health.

The School Lunch Program

Miss Margaret Prentice

Chairman, School Lunch Supervisory Staff, New York State Education Department

MUCH MORE attention is now being given to the improvement of the nutrition of children, through good school lunch programs. This is very satisfying to those charged with the responsibility of the promotion and supervision of this program in New York State.

For the past several years funds have been given to the schools for subsidizing lunches by the U. S.

Department of Agriculture. With the passage of the National School Lunch Act in 1946, this program was placed on a permanent basis. Governor Dewey named the State Education Department as the State agency responsible for the administration of the program. A staff of six supervisors was provided through legislation sponsored by Senator Desmond in 1946, and the schools now have the serv-

ices of trained personnel to help them with school lunch management and nutrition education.

When it became evident early in 1947 that the Federal funds for reimbursing schools for lunches would not be sufficient, Governor Dewey immediately gave support to Senator Desmond's bill for \$2,500,000. Now, more than 500,000 children in over 2,800 schools will continue to receive lunches and milk for the remainder of the school year. Federal and State support have been of inestimable value in furthering the school lunch program.

The major consideration of the State school lunch supervisors is to develop good lunch programs in the schools throughout this State.

What Is a Good School Lunch Program?

Many of our schools are recognizing the importance of a good school lunch. They want the menus carefully planned to meet the nutrition needs of the children and to provide at least one-third of the daily food requirements. The plate lunch is meeting with wide acceptance, since it provides the variety of foods needed in adequate amounts. The menu plans should give consideration to family food habits and to known deficiencies in the dietaries.

Emphasis is placed on the use of proper methods of food preparation so that the maximum food value will be preserved, and so that the food will taste good. Food is prepared in sufficient quantity so that all children may have the required amounts. Children unable

to pay the full charge for the lunch are given the meal free or at less than the prevailing cost. More children than ever before who need the good lunch are receiving it.

Schools are giving increased attention to using approved sanitation procedures so that they may have assurance that the food is clean and free from contamination, that dishes and silver are thoroughly sanitized, and that equipment and facilities present a spotless appearance. The school lunch workers meet health requirements and are properly groomed for their jobs.

The school lunch dining room is the place in which good food habits are developed, the use of approved social behaviors is encouraged, and good citizenship practices are stressed. Teachers are sharing in the supervision of the program and in the teaching of nutrition education in relation to the school lunch.

What Is Being Done to Develop Good Lunch Programs?

To make the good school lunch a reality for thousands of boys and girls, the school lunch supervisors are carrying on a long-time program of pre-service and in-service training for all school lunch personnel.

Many of the home economics teachers are responsible for the supervision and management of the program, and training is being given in our teachers colleges to help them assume this responsibility. The technical institutes are now training some of their students to be cook-managers, and these graduates can assume much

of the managerial work, allowing time for the home economics teacher to share more actively in developing a nutrition education program in relation to the school lunch.

Our colleges and universities are offering summer courses to meet the increasing demand for additional work in school lunch management and nutrition education. New York University offers a workshop course in Nutrition Education and the School Lunch not only for home economics teachers, but for principals, elementary and secondary school teachers, school nurses, and others. Syracuse University offers courses in School Lunch Management and Quantity Food Preparation, and at Cornell and Columbia Universities courses are included on various aspects of the school lunch program.

There is a growing interest on the part of those responsible for training all teachers in stressing nutrition education and the school lunch, and some courses for school administrators include the principal's responsibility for a good school feeding program.

Recognizing that hundreds of cooks in our schools have had little preparation for their work, a training program was initiated. During 1944 and 1945 a series of 17 one-day training schools was given, in which more than 800 cooks, and others concerned with these problems, participated. This was followed by three one-week summer conferences in the Canton, Cobleskill, and Morrisville State Institutes last summer. Already four similar training schools are planned for the summer of 1947.

Opportunity is given for the cooks to receive instruction in quantity food preparation, nutrition, and management. They can observe good sanitation procedures and discuss their own problems. Emphasis is placed on the serving of a good complete lunch.

Another important phase of our program for developing good school lunches is carried out by the supervisors in their visits to the schools. Hundreds of lunch programs have been observed and technical advice given on planning meals, preparing food, selecting and arranging equipment, scheduling personnel, keeping records and accounts, and developing a nutrition education program. Help has been given not only in the expansion of present programs, but in the development of many new programs.

Working cooperatively with all organizations and agencies concerned with the program in this State has paid real dividends. The New York State School Lunch Advisory Committee, under the leadership of Mrs. Hilton Dier, of Lake George, has been of tremendous value in promoting legislation, clarifying the program to all of the members of the organizations that they represent, and in promoting the organization of programs in communities throughout the State. This group is made up of representatives of over 75 organizations and agencies concerned with school feeding and nutrition education. Many of these organizations are including the school lunch as a part of their yearly plan of work. Such cooperation and support has made many com-

munity school lunch programs a reality in New York State.

Nutrition Education

One could not discuss our State program without including nutrition education. Already some schools have achieved a good lunch, and are ready to give more attention to this aspect of the program. Many educational groups have developed helpful material. Outstanding among these is the bulletin "Good Nutrition for Everyone", prepared by some State Education Department members under the direction of Dr. E. R. Van Kleeck, Assistant Commissioner for Instructional Supervision, and Director of the School Lunch Program. The school lunch offers unlimited opportunities as a laboratory for the teaching of nutrition.

Our major objective is to improve the nutritional status of children. We believe that a good lunch every school day makes a great contribution toward reaching this objective. To have good

lunches in our schools we are continuing:

1. To give supervisory assistance to individual schools to extend their present programs and to develop new programs.
2. To develop with colleges and universities a program of pre-service and in-service training for all concerned with the school lunch program and nutrition education.
3. To work cooperatively with all organizations and agencies interested in school feeding and nutrition education to promote the program.
4. To correlate the school lunch and nutrition education.

No program is making any greater contribution to the improvement of the physical well-being of our children. Its permanent continuance will play a great part in developing stronger and healthier citizens.

Problems Facing the New York City School Lunch System

By Harvey K. Allen

Director, Bureau of School Lunches, New York City Department of Education

DURING the last few years interested committees of the Federal and State governments have already accumulated a considerable body of evidence from the most authoritative sources to prove that among the Nation's most important assets are the health and vigor of its citizens—that good nutrition is an indispensable requirement for sound health—and that school lunches can make an important contribution toward insuring good nutrition, both by providing growing children with the nurture they require, as well as by cultivating good eating habits during the formative years which will yield life-long benefits.

There is also a wealth of evidence to demonstrate that the economic health of the Nation is inseparably bound to good nutrition, with particular emphasis placed upon the extent to which full utilization of the extraordinary agricultural production of the country depends on good nutrition.

Finally there is evidence to show that proper nutrition is essential not only to the health and well-being of the Nation's children but to their growth and development as citizens, because a child's educational progress is dependent upon his health.

Since the record contains so

much expert testimony in support of the need for school lunches, it seems unnecessary to expand upon justification of the school lunch program. On the other hand, it is one thing to share the high vision which the protagonists of school lunches have created; it is another to face the practical considerations involved in realizing this vision. I should like, therefore, to outline some specific problems which we face in New York City in achieving our school lunch objectives.

By far the most important and the most urgent of our problems is that of securing adequate financial support not only to extend the program to the many thousands of children who do not presently benefit from it, but even to continuing it at its current level.

In New York City our experience indicates that during the '46-'47 fiscal year we shall serve a total of 21 million Type "A" hot lunches, and 26,600,000 Type "C" lunches (milk only). This represents an increase of more than 20 per cent over the preceding year, and, in the case of hot lunches, an increase of 45 per cent over the year before that.

It cannot be expected, however, that this rate of growth will continue; on the contrary, there is every reason to believe that it will soon level off, and perhaps even decline unless positive measures

are taken to maintain it. Such an eventuality would mean arresting the program long before its full potentialities had even begun to be realized for, despite the growth in the past two years, less than 15 per cent of the school children of New York City receive hot lunches in school.

One of the most important factors which influences participation is the value of the meal offered. By value I mean the combination of attractiveness and palatability of the food and the price charged. Highly appetizing and attractive food increases demand, and low prices multiply the force of these influences.

The prices at which nutritious school lunches are offered in New York City—12 cents in elementary schools, 17 cents in junior high schools, and 18 cents in high schools—represent perhaps the best value to be had in any urban area in the country. However, the costs of nearly everything required for the preparation and service of these lunches—food, labor, supplies and equipment—have mounted significantly. Because we have reached the limit of presently available financial support, such increased costs have begun to limit the variety of foods which can be offered at these minimum prices, and exert increasing pressure for increases in selling prices, both of which conditions are bound to affect participation adversely.

It is generally known that the actual costs of these meals exceeds the selling price, because the Federal Government contributes nine cents toward the cost of each hot

meal, and two cents toward the cost of each half pint of milk served separately, while the balance of the cost, approximately five cents, is met from income from the sale of other foods in high schools and junior high schools, and in elementary schools by a direct contribution of several hundred thousand dollars from the City of New York. Substantial additional contributions are made by the City in providing and maintaining facilities and equipment. Further help toward meeting increased costs, however, cannot reasonably be expected from these sources so that it becomes obvious that a new source of financial aid is imperative, if we are to be able to offer the type of lunch which will appeal to the child, at a price which will bring such a lunch within the reach of all children who can benefit from it.

It is equally obvious that the most logical remaining source of financial assistance is the State. School lunch legislation and appropriations to assist communities in establishing, operating and expanding school lunch programs have, I know, been under discussion for some time; however, to date no provision has been made for State aid for school lunches.¹ Yet the need for such legislation becomes daily more urgent, and I must emphasize as strongly as I possibly can, that not only does realization of the full potentialities of school lunch service depend upon such assistance, but that even the maintenance of existing levels of service requires it. The very minimum which the State should

¹ Ch. 10, Laws of 1947 appropriated \$2,500,000.

provide is six cents for each hot meal and one cent for each half pint of milk, for these amounts represent only the actual increases which have been experienced in the cost of food alone.

There is one other very good reason why provision for State aid for school lunches must be made at the earliest possible date. Since Federal funds appropriated to assist states in the conduct of school lunch programs are the most important single factor in enabling us to offer school lunches at low prices, the number of such lunches which can be served is limited to the amount of Federal funds available to underwrite the costs. Unfortunately, the impetus toward an expanded program which the recent enactment of permanent Federal school lunch legislation provided is largely counteracted by the limited amount of funds appropriated to implement the act during the fiscal year 1946-47. As a result, New York State received as its share of the total appropriation for food assistance the amount of approximately \$2,600,000, which is \$1,000,000 less than was provided the previous year. In view of the fact that it was necessary during the past year for the Department of Agriculture to refuse aid to many communities which did not already have school lunch programs in operation, it is apparent that not only cannot further development of New York's school lunch program be accomplished, but that present programs cannot be continued for the balance of the year unless additional Federal funds are provided. New York City received in 1945-46

\$2,000,000 of Federal food assistance; in 1946-47 its share of the State's allocation is estimated at \$1,300,000. The need, however, based only on present participation is for at least \$2,500,000. Thus, barely half of the amount necessary to carry our present program through the year can definitely be counted upon.

While the law does provide for re-allocation of funds not required by any states, it is highly improbable that much help can be expected from this direction because the Under Secretary of Agriculture recently stated that he believes New York to be typical, in that its requirements exceed its share of the school lunch appropriation. The only possibility for relief lies in convincing Congress of the need for a sizeable additional school lunch appropriation for the balance of the fiscal year.

It must be recognized, however, that the National School Lunch Act was intended to encourage and assist states in carrying out their school lunch programs, and not to carry the entire financial load. Therefore, to be able to present a convincing case for additional funds with any expectation of success, it is essential that the State have already contributed toward the program to the full extent of its resources. I repeat—the additional Federal assistance required cannot be reasonably asked or expected from the 80th Congress unless the State has given concrete evidence of its willingness to bear its fair share of the costs by the enactment of appropriate legislation before the next Congress is called upon to consider a

supplementary school lunch appropriation.

In summary, the major problem with which we are faced is this:

1. Full realization of the many benefits to be derived from the school lunch program requires better meals at lower prices;
2. The limits of local resources to provide for such improvement and consequent expansion of the program have been reached; and,
3. Presently available Federal aid is insufficient even to meet the need at current levels of participation.

The solution to the problem lies in the early enactment of State legislation which will assist communities in improving and expanding their school lunch programs, and at the same time establish a basis on which to seek necessary additional Federal assistance.

I know that the demands upon the State's resources are many and varied, but—if it be true that the years of childhood and youth are the only years during which nurture resulting in a sound body can be achieved—if it be true that learning is a function not merely

of intellect and curiosity but also of bodily vigor, if it be true that the purpose of the school lunch program is to secure the development of sound bodies and minds in our children—then I know of no better use to which the resources of this great State can possibly be put.

It was my high privilege to witness the performance of the American Soldier in the mountains of Italy, in the fields of France and in the mire and mud of the Philippines—to witness the performance of American youth in combat in many parts of the world. And I was convinced it was not the superiority of our equipment or material that gained us the victory but it was the courage, the physical stamina, the unwavering performance and tenacity of our men which conquered. These are qualities we need in peace, just as in war. They are qualities that are more important in safeguarding the future of this Nation than any bastions that can be built of steel or stone. I submit there is no better use to which the resources of this great State can be put than to provide to its children proper nutrition, to secure to its children the opportunity to grow into sturdy citizens, capable of meeting the future competently and successfully.

School Lunches in New York City

By Mrs. Alexander M. Dushkin

Vice Chairman, New York City Food and Nutrition Committee

IN WASHINGTON, the U. S. Department of Agriculture recently called together a group of eminently qualified persons to consider the indicated school lunch program on the *national level*. Among the Conference participants were men and women of highest rank and calibre from related fields, such as: Thomas Parran, Surgeon-General; Sir John Boyd Orr, Director General of the FAO; Miss Hazel Stiebeling, Chief of our Human Nutrition Bureau; and Mrs. Agnes Meyer, special writer on National Welfare programs.

They, among others, highlighted the relation of the school lunch to the improved national diet; to national food habits of health; to our changing agricultural economy; and to the foundations of our future as Americans, also as citizens of a One World at peace. They brought convincing evidence from here and abroad that great potent good is posited in a properly conducted school lunch program. They look forward to a time, in the not too distant future, when the school lunch will be free to all children as text-books are free, and will bring equally distributed and far-reaching benefits.

In New York City, too, there is a growing appreciation of the values inherent in our school lunch program. The fact that the Board of Education now administers the service, places the program where it belongs and where it can best



—USDA photo by Osborne
Hot lunch helps "Jerry" get good grades.

move forward: on *educational tracks!*

We therefore hail and endorse the high regard for the school lunch program which was expressed at the Washington Conference. Furthermore, we hope, most earnestly, their estimate of its value to good national health and sound citizenship building will be reflected and incorporated in appropriate Congressional action. The constant upward spiral of food costs may indeed make additional help on the national level an imperative within the next months if we are to head off the impaired health of America's children.

But under our present or any other setup, Washington alone cannot fully meet the needs of New York City. To implement the indicated program for a city of seven and a half million, with over 800,000 school children, we need, in addition, financial, educational, promotional and administrative as-

sistance from our city and our State. In the school lunch area, as in other fields, they must begin to dream and plan and act commensurately with the need and the power vested in us. We cannot afford to fail to build a happy, healthy young generation! Only great evil can result from our failure to do so.

For All Our Children

It must be a matter of concern to our city and State that we may get \$1,000,000 less in Federal subsidies because our proportional share of the budget may not be met. But not for this reason alone is more financial assistance needed. A problem of far-reaching re-education at all levels is involved. **We need to re-orient our thinking on the role of the school lunch for all of our children in all of our schools.** Then only shall we fully exploit its educational potentialities for improving the eating habits of our city's population as a whole! Then will come the necessary shift in the new point of view required of us. The school lunch will then cease being thought of as a free offering to poor children or a bargain meal for the good shoppers. Our aim will be to reach as many children as possible. We shall know that we need *not worry* over but rather celebrate the fact that this year 25 per cent more of our children are demanding the special hot lunch!

Less than two years ago, our School Lunch Committee submitted a report to His Honor, the Mayor, which suggested possible improvements in the school lunch service for our city. Our chief

concern stemmed from the fact that only 15 per cent of the school population that was compelled to eat lunch at school was then benefiting by the hot lunch. Through some well-spent effort, the number who now eat the special hot lunch has increased to a gratifying degree. Yet even today, they constitute only about 13 per cent of the total school population. This leaves a wide area for necessary expansion of the program. It is particularly provocative when one is told that daily 1,000 gallons more of the hot dish is being consumed by 70,000 children in the elementary schools as compared to 85,000 children five years ago!

If true, this fact bears further study. One is led to ask: (1) Are our children hungrier today? (2) Have we increased our portions, and if so, why? (3) If the food served today is of better quality, and costs more, will our present appropriations carry us through the year? Unless we answer these questions today, they may return to plague us tomorrow. The answers in large measure are with our city and State! They must help us find them.

To provide our city with the means necessary for our indicated program, there will be need for mobilizing an enlightened public opinion. Fortunately, there is a neutral agency which, along with other bodies, could help considerably in educating the public to the importance of the school lunch as a key for the better nutrition of our children and through them of their families. The New York City Food and Nutrition Committee is a coordinating body for the 80 or

more agencies which conduct a nutritional program. If given a modest budget by our city and State, this committee could go far in creating an appreciative, understanding attitude in the community for the role of the school lunch.

Educational Yardstick

When the State allocates appropriate sums from its treasury for the school lunch program, it will be in a position to make certain conditions with recipients of its aid. For example: One hopes that just as the Federal subsidy is made conditional on the schools meeting a set nutrition yardstick, so the State will set up an *educational* yardstick for schools to follow: One would wish that out of Albany will come not only a per capita school lunch appropriation—but the suggested educational setup. Certain marked benefits suggest themselves immediately:

1. The task of persuading principals to introduce school lunches would be made official policy; they would be reflected in directives from the office of the State Superintendent of Schools, to the cities' superintendents. This would eliminate the use of trained nutritionists as promotion personnel. Their time would then be set free for improving the service and for really making the school lunch program the vehicle for improving the nutrition of all of our city's seven and a half million people.

2. School lunch personnel should be appointed on the basis

of appropriate civil-service examinations. Due regard should be given to the supervisors' grade so as to fix salaries at a level that will attract the best qualified people.

3. Orientation courses in the school lunch as a school project could be introduced for teachers and related staffs in the three systems: Elementary, Junior and Senior High Schools.

4. Professional criteria should be set up for school lunch personnel and teacher training programs should reflect these demands.

5. Uniform administrative set-ups might be suggested for communities of a given size.

These are among the few educational guards that a state might well require and suggest of its subsidized schools. There are others.

One more basic problem faces us: inadequate school space for the program. Old buildings require revamping. It is hoped that new ones will make adequate provision for the preparation and serving of lunches in consultation with experts. We hope the school dining room of the future will take on more and more of the character of meals served at home. What is wanted for growing children, is not the atmosphere of a mess hall, a food dispensary. Rather the aim should be to make our school cafeterias "homelike" — cheerful, happy rooms which radiate the joy that should come from breaking bread together; not the basement but the *roof view* would be indicated.

In New York City, the Central Kitchen was an emergency meas-

ure. Decentralized preparation should be initiated at the earliest moment. Only then will the school lunch become an instrument for integrated foods and nutrition education. Pending the building changes which will make this possible, one or more schools from the elementary, junior and senior high school systems should be selected as "*area demonstration centers*" as to how the school lunch can be advanced through being integrated into health education and home-making units as well as those in the natural sciences.

Our draft statistics revealed that a startling per cent, approximately 40 per cent, of our young men were disqualified for service because of

physical defects related to poor nutrition. The school lunch offers us a most efficient and protective medium for correcting the physical and mental fate of the rising generation. It is for our city and for our State to meet the challenge.

A sound school lunch program can be made the vehicle for safeguarding the improved health of all of New York's children. It can be made the track by which to reach our seven and a half million with better diets. Their children will teach them, as they in turn are fed and taught. It is for our city and State to build a school lunch program which will make New York's boys and girls a source of pride to us, an example to others.

Background of Microchemical Assays

By Dr. Otto A. Bessey

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IT IS generally accepted that there are benefits to be derived from studies of levels of nourishment—there are benefits in terms of growth-development and general health to be derived. It is also generally accepted a substantial portion of our population is not receiving adequate and proper nourishment. The problem arises in connection with these two generally accepted observations as to the extent of benefits to be derived at any particular level of nourishment and who, among our population as groups or individuals, would benefit most from such attention. This, essentially, means we are lacking adequate methods for determining nutritive status, and until we have more adequate methods for determining nutritive status we are not going to be as well informed in this field as it would be wise for us to be.

Methods, in order to be satisfactory for the determination of nutritive status, must be accurate and economical and practical. Dr. Lowry, my colleague, and I, and the group working with us in the Institute started by the City of New York, have devoted some of our time to determining methods for the determination of nutritive status. Our direction has been mostly in the chemical analytical field, in developing determinative tests. There are other methods, of course, which may be employed. One is by history. If we knew

accurately or were able to obtain accurate information as to what individuals and groups of individuals are eating, that could be compared with more detailed information as to what is required for optimum health. But you who have had experience in this field know that history-taking is a laborious undertaking and is not always as accurate as we might like to have it. I am merely pointing out the handicaps there are to history-taking methods, and it doesn't mean in certain circumstances they are not very valuable.

The second method is through clinical observations. These would depend upon the judgment of the physician, and because of that a certain feature of subjectivity is involved. They are also limited by the fact they only apply in the very narrow range of structure or tissue changes. We all know it is possible to maintain animals at sub-minimum levels and still increase the physiological performance by feeding at higher levels of nourishment. This brings up a point that is very important, and that is that nourishment is not a definitely known physiological phenomenon. It is the type of physiological phenomenon which, over a long range of level, can receive increasing benefits over the range of nourishment. So that it is quite different from the problems encountered in the study of infectious diseases or tumors or

pathological things of that sort that occur in public health. Our studies must cover the whole scale and spread over a very wide scale. That is very important, because we are not interested in just preventing disease, particularly, but in determining nourishment levels from which benefits may be derived by the population as a whole.

The third type would be one of the use of chemical methods. These are a possibility because there exists, for a good many of the known nutritive essentials, a relation between the average daily intake and the amounts of nutrition absorbed by the blood stream and carried to the body tissues. This relationship may be determined by the analysis of blood samples taken from time to time. This is a matter over which the patient has no personal control. I mean, he can't manipulate it. It depends upon his dietary performance prior to testing. Such methods have the inherent quality of being able to give information over a wide range. They are also methods that can be objective because instrumentation is involved and not the individual judgment of the person who is doing the measurements. For this reason we have been interested in extending chemical methods as a means of contributing more to the problem of determining nutritive status. However, there are other factors involved. Some of the problems that arise are these: that up until recently in order to measure two or three of the nutritive essentials it would require 5 to 15 c.c.'s. of blood. I think in doing this kind of work and in planning for it, it is also necessary to plan into the

future and methods should be designed so that development of that sort can become a possibility as far as analytical methods are concerned.

Because of these requirements for large amounts of blood the chemical methods in existence were not practical. You can't go into a school and use a technique required for taking that amount of blood. It is necessary to use a venous puncture to take samples of that volume, and it creates barriers on the part of the teachers and the children and the parents. It is just simply impractical to employ such methods. The amount of blood required is too great, and they simply will not let us come back and follow through.

Then another problem: Heretofore it took too much time after you obtained the sample to make the analysis. If it takes too many man hours you can't engage in doing survey studies because it takes too many hands. We feel that we have gotten around these two practical points quite satisfactorily by a development of a series of micro-chemical techniques, so that we can determine, at the present time, nine of these determinatives and need to have no more than three-tenths of a millilitre of blood. And, of course, for a good many purposes, that you would not be concerned with, for all the nine materials we are interested in very much smaller volumes of blood would suffice. The amount of blood is easily obtainable by a small finger-prick technique. There is practically little or no sensation of pain, and it just amounts to the prick of a blunt pin. The children

do not object to it, and will let us come back again the next week and take another specimen. It is also a rapid and economical method and we regularly have gone into a school with four people in a team and collected blood specimens at the rate of 50 an hour, and we can pack up our kits and be out of the way. The children don't mind, and they will let us come back next week without any hesitancy at all—and the school people don't mind it so much—and the number of man hours that we have to put in collecting specimens is very greatly decreased over that required with the use of other methods.

In the laboratory it is possible to analyze those specimens two to ten times more rapidly, and so requires only one-half to one-tenth the number of man hours to do the determinations. Further, the precision of the methods are as good or better than any other chemical methods which can be used on any other scale. That is necessary for this kind of work, because you can't afford to give way to inaccuracy. These methods have reached a scale in development such that we are using them on survey work with school children, and we have been doing that for two or three years in New York. Part of that work was a development of the methods, because, as many of you know, you can only go so far in the laboratory with such work, and invariably, when you go outside, you find new problems to overcome which cannot be anticipated and are met only within the field. So that a good part of the survey work we have done in New York City in the last two or three years has been by

way of helping us develop the methods. Through the help of the Desmond Committee, we have done a small-scale survey including eight schools in New York State—three in the city and five outside the city—composing some 1200 to 1500 subjects. We were able to collect the specimens at the rate of 50 an hour, and there was very little disturbance caused.

Now I would like to point out the limitations of such work. Figures themselves are of very little use unless you can interpret them. Although we know, in general, that many of these nutritive essentials are fairly direct of what the average daily intake has been it is not all so simple. There are other factors which will influence the absorption of these materials and therefore you can only safely use them when you have full knowledge of those other factors. So you can understand why our studies must be conducted over a wide range.

We are 90 per cent, I would say, complete on our knowledge in that field, but we still have further studies to do and therefore we must interpret our figures with the amount of caution which one should soundly have under the circumstances. Other bits of information we should have before we can make these figures mean what they should mean is studies which tell us what the average level should be when we know what the intake is. We don't know the intake in all surveys. That means we must have other sources to determine that factor. Scientific literature has a certain amount in it representing the efforts of people working in

this field in the past. From those studies we can obtain the data I have just described reasonably closely, but as we are able to study this problem more and more we will be able to determine more accurately just what the proper relationship should be. At the present time we still have more to do in that region. Judging from the progress we have made we ought to be able to have most of that information in another year. I can't say very much about what we have found out because all of that data are being collated and are being analyzed in one group, and we won't have anything out of the hopper until we can sit down and study it. But one of the first things we were interested in was in the City of New York last year, where we could find groups of children where we could determine differences between the children, regarding their nourishment. So that part of the early surveys we did with methods had to deal with this problem. Now, it is quite a pity to say there is a great difference between groups we selected in New York City regarding their nourishment. Now, that is not news. But by means of these micro-chemical analytical tests we are able to weigh those differences. It beats judgment in our minds every time. It places figures before us so that we are able to say a certain percentage of this type of sample has yielded analyses that will allow us to conclude that this group is 25 or 30 per cent, whatever the figure might be, of the children who are receiving less than the amount of ascorbic acid, let us say, which we know it is wise to receive to obtain

maximum nourishment. We have found there are striking differences among groups in the City of New York. So that we know our problems are such and that our methods which we have developed are capable of doing the measurements. I would like to also point out the purpose of having figures. When one is dealing with problems of health, where your facilities are limited and that is always the case where you invade a new field—therefore, you must have some means to decide where to start. With methods designed to make objective studies you have a means for deciding where this might be done. Furthermore, you have a means by which you can convince the other man or a means by which you can at least talk to him that doesn't depend upon your judgment but depends upon figures which he will understand. So much for the methods.

Just one other point, and that has to do with the matter of the kind of assistance that those of us who work in this field must have. One thing that requires our most efforts and our most time has to do with making those arrangements that will allow us to work with methods after we get through the laboratory stage of it. I was very pleased to see the fine cooperation we got from the schools that Mr. Ruskowski and Senator Desmond prepared for this study. But we need always, no matter how co-operative the arrangement eventually works out, we continually meet with this problem—that the school people and the children and the doctors and the parents want to know what they are going to get

out of our efforts in the school, and very often they want to know, as individuals, what they are going to get out of it. Now, it is practically impossible in the beginning for you to guarantee some kind of benefits from a simple blood analysis. You see, when we start we don't know anything about this subject, and if you don't have some means to collect and orientate yourselves then you will never be able to benefit an individual. What we are interested in is being able to do something for the benefit of herd interests. In the beginning we can't always guarantee an individual benefits from the activity; we can just say if we get enough cooperation in this kind of work that next year or five years or ten

years from now we will all benefit from it. And we would like to sell that point, on the ground we all know great improvements have been made in public health in the last five and ten years. They have been made as a result of studies of this sort. We have to view what has happened in the history of research as being the best argument for what we can expect of efforts of this type. It helps a great deal if it would grow on the part of the people in the schools and our legislators and all the other people we come in contact with that this is work we can't do entirely in the laboratory. We have to have your help, for the reasons I have briefly outlined.

Nutritional Assay of 1,200 New York State School Children

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THIS is a report of the results of a nutrition survey conducted in eight New York State high schools during September 1946. The survey was undertaken at the request and with the support of the New York State Joint Legislative Committee on Nutrition. The purpose was two-fold: to demonstrate the feasibility of large-scale surveys by use of newly developed microchemical methods, and to contribute objective data on the nutritional status of New York State school children.

Modern health practice is concerned not only with the control of those factors which lead directly to disease but with all those conditions which contribute to the fullest realization of inherited potentialities for growth, development, efficiency and resistance to disease. New knowledge emphasizes the importance of nutrition to these positive attributes of health.

It has been clearly shown that a wide intermediate zone separates the level of nutrition merely adequate to prevent obvious signs and symptoms of malnourishment from that level which is optimum. With this in mind as well as a cognizance of the available data on dietary intakes of the population and prevalence of clinical deficiency disease, it seems evident that the principal problem

in nutrition in this country is not the prevention of obvious and severe deficiency disease but rather the obtaining of that full value of health which optimum nutrition offers. The Food and Nutrition Board of the National Research Council has recently summarized¹ evidence which shows that a significant proportion of our population now receive a level of nutrition which fails to meet the optimum standards recommended by that body of scientific experts.² These facts and considerations have led health authorities, governmental agencies and an informed public to take a deep interest in nutrition as a health matter.

While there is substantial evidence to indicate that a large section of our population would benefit in health if their nutrition were improved, the evidence is not so extensive nor so quantitative as is needed to establish the degree of such benefits. The accumulation of data on this problem as well as efforts to locate those most likely to need attention in this respect, has been handicapped due to the lack of adequate practicable methods for measuring nutritional status over a wide range of nutritional levels.

During the past four years this laboratory has developed a series

of microchemical tests which have been demonstrated to be useful in this problem of determining nutritive status and which give promise of even greater usefulness with further study, application and development. By analysis of a few drops of blood readily and comfortably obtainable from the finger tip, it has been possible to measure the considerable variation in the nutritive status found among selected groups of school children in New York City.³

Methods are now available for blood analysis for eight of the dietary essentials or their important tissue derivatives. A detailed description of the methods and their use may be found elsewhere.⁴⁻¹³ When blood analyses of groups of children by these methods are compared with similar analyses obtained from persons being maintained on diets of known nutritive value, it is possible to estimate the recent intake of the various nutritive essentials over a wide range of intakes. In turn, these dietary intakes may be expressed (as has been done in this report) in terms of level of nutrition on the basis of accumulated knowledge regarding dietary intake and nutritive status. The observations and conclusions in this report are based on the above methods and premises.

Survey Procedure

Blood specimens were collected during September 1946 from approximately 1,200 children aged 11 to 19, from eight New York State schools. Although the survey involved a larger number of sub-

jects than any study of this type previously undertaken, it, nevertheless, was small in comparison with the numbers which would be necessary to be representative of a cross section of the schools of the State as a whole. The study was, therefore, made on a selected group of schools. The schools were selected to include central schools of rural areas (Cato and Pulaski) and schools from cities of widely varying total population (Syracuse, Oneonta, Kingston and New York City). The schools were judged to be representative of the respective areas. In New York City one school, the William Howard Taft High School, was selected as representative of a school located in a reasonably high economic area, while the other two schools, Chelsea Vocational High School and Yorkville High School of Women's Service Trades, are attended by children from moderate to low-income families.

The blood specimens were collected in a uniform manner from nonfasting subjects during the morning and early afternoon hours. Approximately equal numbers of boys and girls were included. The age distribution is that found in the seventh to tenth grades. Since parental consents were required this is a possible source of biased selection. However, the co-operation of the school authorities and children was such that any selection on this basis is thought to be insignificant.

The samples collected (about equal numbers from each school) were analyzed for the vitamin A, carotene, ascorbic acid (vitamin C), riboflavin (vitamin B₂), alka-

line phosphatase and total protein of the serum, and the blood hemoglobin. About one-sixth of the samples were also analyzed for the iron of the serum.

Results

In Figures 1-23 is presented in graphic form, by schools and for each nutrient tested, the percentage of children showing specified blood levels of the various nutrients. Table I presents an interpretation of these data in terms of four levels of nutrition i.e., poor, fair, good and excellent. The basis on which these interpretations are made is set forth in Table II and requires further comment.

The levels of most of the dietary essentials in the blood and body tissues vary with the recent dietary intake of the particular essential. This is the basis for the use of chemical methods for the evaluation of nutritive status. It is necessary to have two types of information in order to interpret blood analyses in useful terms of nutritional status. First, it is necessary to know what blood levels correspond to what dietary intakes and second, it is necessary to know what level of nourishment is represented by a given dietary intake. Because of the complexity of the problem and the stage of development of the subject, the information on both of these points is far from complete. It is, however, possible by consideration of all the scattered data available in the scientific literature and the recent experiences of this laboratory, to closely approximate the relationship between blood levels and dietary

intakes of the substances dealt with in this survey. Information on the second point has been summarized by the Food and Nutrition Board of the National Research Council. The classifications and figures in the "Key to Interpretations of Blood Levels in Terms of Adequacy of Nutrition" presented in Table II represent the authors' judgment based on the information cited above. It is fully realized that some changes in these figures will undoubtedly be necessary with the accumulation of further exact knowledge of the subject. A discussion of all the data and considerations involved in formulating Table II would become too technical for the purposes of this report.

Vitamin A—It will be noted from Figures 1 and 2 that the distribution of analyses in the various schools was essentially the same except perhaps for schools G and H in which there appears to be a more than average number of children with higher serum A values. Referring to Table I, it will be seen that nearly all members of all groups are classified as having a satisfactory vitamin A intake.

Carotene—The serum carotene analyses which are an index of recent intake of green and yellow vegetables are summarized in Figure 3. Although schools B and C show a slightly larger proportion in the lower ranges and schools D and G a slightly larger proportion in the higher ranges than the average, the differences are not marked. It will be noted, however, from Table I that all groups contain a significant percentage of

children who are not receiving as much green and yellow vegetables as are thought desirable for the best nutrition.

Ascorbic Acid—The ascorbic acid figures (Figure 4, Table I) confirm the conclusions reached from consideration of the carotene analyses, namely, that none of these groups is receiving as much fresh fruits and vegetables as are thought wise for the best nutrition. With the exception of school G, more than 50 per cent of all groups were quite certainly receiving less ascorbic acid at the time of the survey than is recommended by the Food and Nutrition Board of the National Research Council.

Riboflavin—Figures 5 and 6 show that the riboflavin intake of all groups was essentially the same. A possible exception to this is school E where the intake may be slightly higher than in the other groups. It will be noted from Table I that a small but significant proportion of all groups except G fall below the zone of good nutrition with respect to riboflavin as defined in Table II. However, since the measurement of riboflavin in serum is a new procedure, interpretations of these riboflavin data must be made with greater caution than those of the other data reported.

Serum Protein—Figure 7 summarizes the serum protein data. Considering the normal variations expected in this constituent of the blood due to nondietary causes, no essential difference is found between any of the schools. It will be noted also from Table I that no

group shows a significant percentage of low levels.

Hemoglobin and Serum Iron—

Since the *normal* hemoglobin content of the blood increases with age during puberty in the male, but not in the female, it is necessary in comparing groups or in evaluating hemoglobin levels to take cognizance of the age and sex. The normal physiological variations are clearly demonstrated in Figure 8 which summarizes the hemoglobin values from all schools. It will be noted that whereas the average boy from these schools shows a progressive gain in hemoglobin between the ages of 12 and 19 years, the hemoglobin of the average girl remains practically constant at the lower level characteristic of both sexes during childhood. Figures 9 to 15 summarize by sex and by age the hemoglobin values found for each of the schools studied. To facilitate comparison, the corresponding average values for all schools are repeated in each graph. All schools are quite comparable with two exceptions: The girls in school D showed hemoglobin values higher than average, while the girls in school F gave values that were significantly lower than the average for all schools. Referring to Table I it will be seen that although there were but few cases which could be classified as "poor" there is a significant percentage classified as only "fair" in most schools. The highest percentage in this classification was found in school F.

The concentration of *iron in the serum* was measured in about one-sixth of the cases which were

chiefly those with either low or quite high hemoglobin values. It was found that one-third of the girls with "poor" and "fair" hemoglobin values had a low concentration of serum (less than 70 micrograms per cent), whereas only 6 per cent of the girls with "good" and "excellent" hemoglobin values had a low serum iron concentration. Similar but less conclusive results were found for the boys. The correlation of low hemoglobin values suggests the presence in these cases of an iron deficiency.

Serum Phosphatase—The enzyme alkaline phosphatase increases in the serum in deficiency of either vitamin D or calcium. Serum phosphatase, like hemoglobin, varies normally with sex and with age as shown in Figure 16 which is a summary of analyses from all the schools. Comparison of Figures 17 to 23 which give the data for individual schools presented according to sex and age shows no differences among the various groups. Table I shows that no schools had more than a few phosphatase values which could be considered abnormal.

On the basis of the analyses just presented and the premises previously stated concerning their interpretation, it would seem that the following conclusions concerning the nutritive status of these eight groups of children are warranted:

1. **Although moderate differences between schools are evident with respect to particular nutrients, there is no marked difference in general nutritive status except in the case of school G.**

2. **The general nutritive status of school G is superior to that of other schools tested. This is shown by the consistently better score in every one of the seven tests used (Table I). This is not an unexpected finding since this school was selected as representative of conditions which would produce good nutrition.**
3. **In all schools including school G the most evident inadequacies in the diet were fresh fruits and vegetables as indicated by the low carotene and ascorbic acid indices.**
4. **In comparison with the results of an as yet unpublished survey in 11 elementary schools in New York City, selected to represent the extremes of economic conditions in New York City, schools A, B, C, D, E, F and H would be ranked as "fair" in general nutritive status, while school G would be ranked as "good." Among the 11 schools previously surveyed were found groups (classified as "poor") with definitely lower nutritional levels than any in the series reported in this study, and also were found schools (classified as "excellent") which appeared to have a level of nutrition superior to any school included in this report.**

Finally, it should be added that the experience of the survey demonstrated in the judgment of the

authors of this report the feasibility and practicability of such methods as a means of evaluating nutritive status on a large-scale basis. It

should, however, be pointed out that the analyses require special laboratory equipment and facilities and well-trained personnel.*

* We wish to thank Mr. John Ruskowski for his help in making many of the arrangements in connection with this survey; also the superintendents, principals, medical officers and nurses of each of the schools involved in the study. We express our deep appreciation for their understanding help.

The co-operation we have received from all parties has been truly excellent.

It has been a pleasure to co-operate with the New York State Joint Legislative Committee on Nutrition and with Senator Thomas C. Desmond, the chairman, in this project.

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TABLE I
The Level of Nutrition in Individual Schools as Indicated by Various Nutritive Substances Measured in the Blood
(For Basis of Interpretation See Table II)
Per cent in each category recorded

SCHOOL		Indicated Level of Nutrition	Vitamin A	Carotene	Ascorbic Acid	Riboflavin	Hemoglobin	Phosphatase	Serum Protein
A	CATO-MERIDIAN	Poor.....	1	4	36	2	0	4	0
	Central School	Fair.....	10	50	16	16	30	1	3
		Good.....	79	42	34	69	40		
		Excellent.....	10	4	14	13	30		97
B	SYRACUSE	Poor.....	1	11	32	4	0	2	0
	Central School	Fair.....	6	48	32	17	21	1	0
		Good.....	76	33	21	70	46		
	Madison School	Excellent.....	17	8	15	9	33		100
C	PULASKI	Poor.....	0	16	48	5	0	1	0
		Fair.....	4	46	25	17	21		1
		Good.....	83	32	17	71	49	99	99
		Excellent.....	13	6	10	7	30		
D	ONEONTA	Poor.....	1	9	20	5	0	2	0
	Intermediate School	Fair.....	5	32	28	26	12		1
		Good.....	81	48	22	62	43	98	99
	High School	Excellent.....	13	11	30	7	45		
E	KINGSTON	Poor.....	0	12	36	7	0	1	0
		Fair.....	4	38	22	24	19		1
		Good.....	80	44	25	63	51	99	99
		Excellent.....	16	6	17	6			

		Poor.....	1	8	41	2	3	0	0
		Fair.....	4	36	27	10	41	0	1
		Good.....	78	45	19	71	40	0	99
		Excellent.....	17	11	13	17	16	0	99
		Poor.....	0	5	4	0	0	1	0
		Fair.....	1	29	20	7	14	1	0
		Good.....	54	50	31	85	44	99	100
		Excellent.....	45	16	45	8	42	0	100
		Poor.....	0	11	22	2	2	0	0
		Fair.....	0	40	33	14	25	0	0
		Good.....	64	41	25	77	30	100	100
		Excellent.....	36	8	20	7	43	0	100

		NEW YORK CITY							
		G William Howard Taft							
		NEW YORK CITY							
		H Chelsea Vocational High School							

TABLE II
Key to Interpretation of Blood Levels in Terms of Adequacy of Nutrition

NUTRITIVE SUBSTANCE IN BLOOD	INDICATED LEVEL OF NUTRITION			
	Poor	Fair	Good	Excellent
Vitamin A..... 1(μ g./100 ml.)	Below 20	20 - 29	30 - 49	50 and Above
Carotene..... 1(μ g./100 ml.)	Below 75	75 - 124	125 - 199	200 and Above
Ascorbic Acid..... (mg./100 ml.)	Below 0.4	0.4 - 0.6	0.7 - 1.0	1.1 and Above
Riboflavin..... 1(μ g./100 ml.)	Below 2.5	2.5 - 2.9	3.0 - 4.9	5.0 and Above
Hemoglobin — Females (All Ages). (gm./100 ml.) — Males (Below 12). — Males (13 and 14). — Males (Above 14).	Below 11.0 Below 11.0 Below 11.5 Below 12.0	11.0 - 12.9 11.0 - 12.9 11.5 - 13.4 12.0 - 13.9	13.0 - 13.9 13.0 - 13.9 13.5 - 14.4 14.0 - 14.9	14.0 and Above 14.0 and Above 14.5 and Above 15.0 and Above
Phosphatase..... 2(Nitrophenol units/100 ml.)	Above 8	Below 8 units — Satisfactory		
Serum Protein..... (gm./100 ml.)	Below 6.0	6.0 - 6.4	Above 6.4 — Satisfactory	

¹ μ g./100 ml. = micrograms/100 cubic centimeters

² See Reference 7

FIG. I

SERUM VITAMIN A

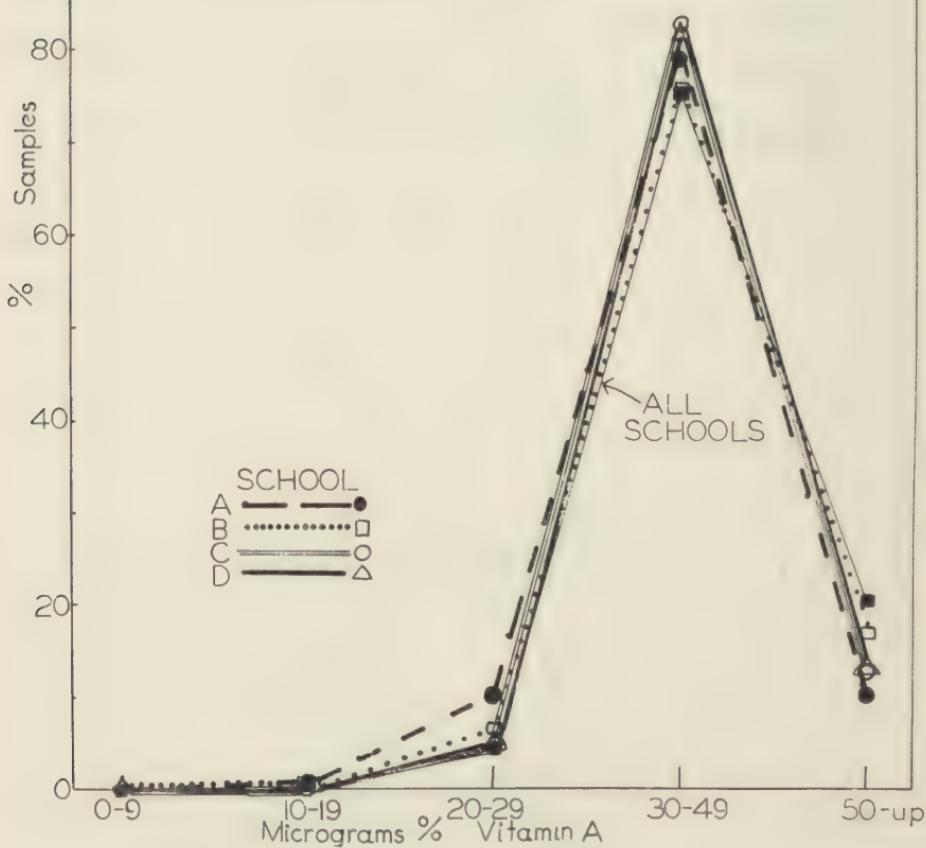


FIG. 2

SERUM VITAMIN A

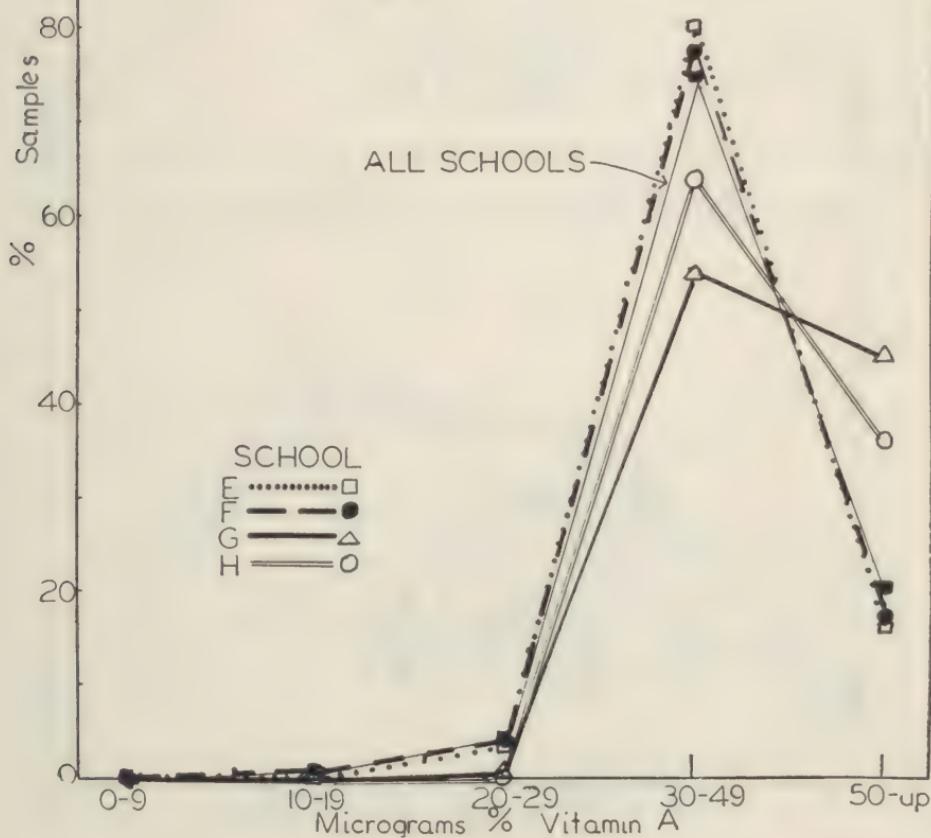


FIG. 3
SERUM CAROTENE

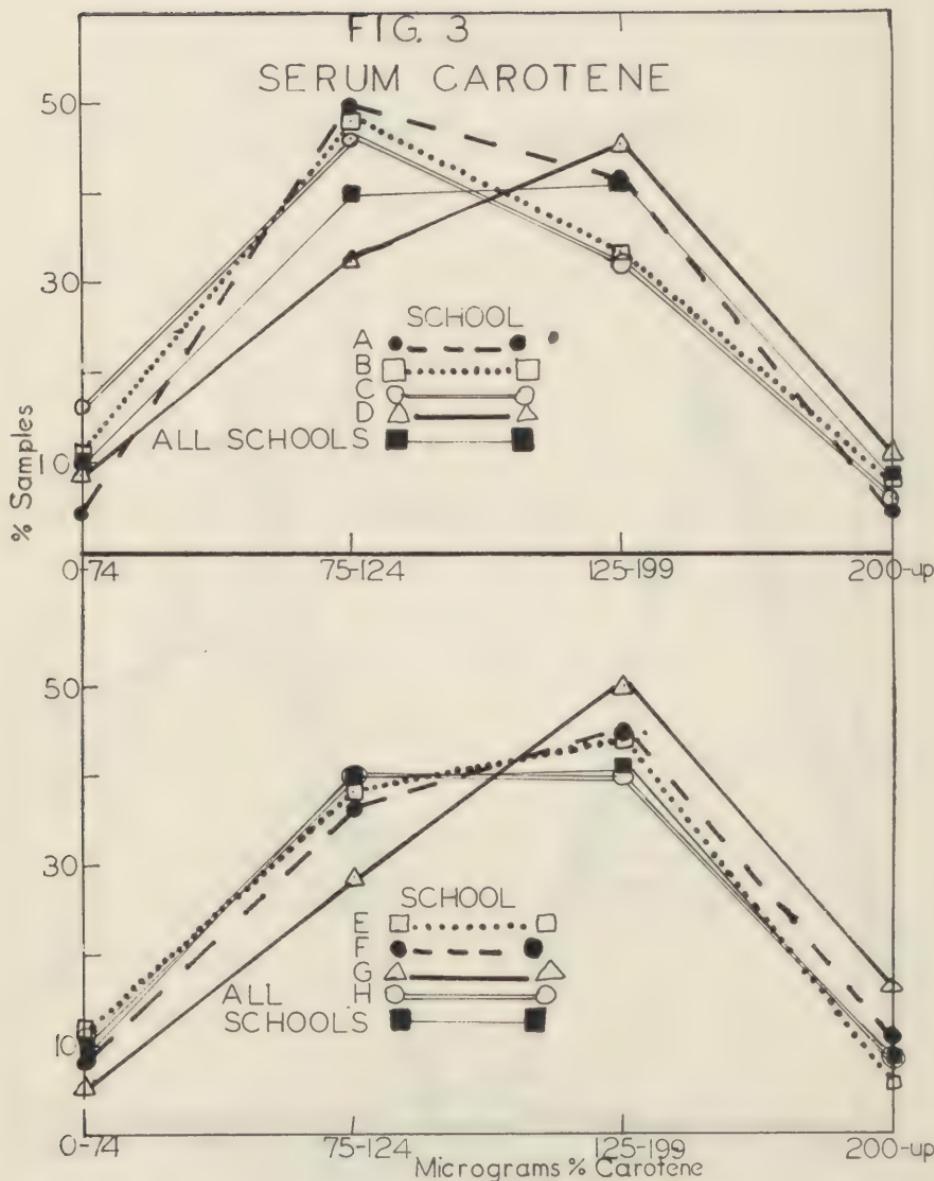


FIG. 4

SERUM ASCORBIC ACID

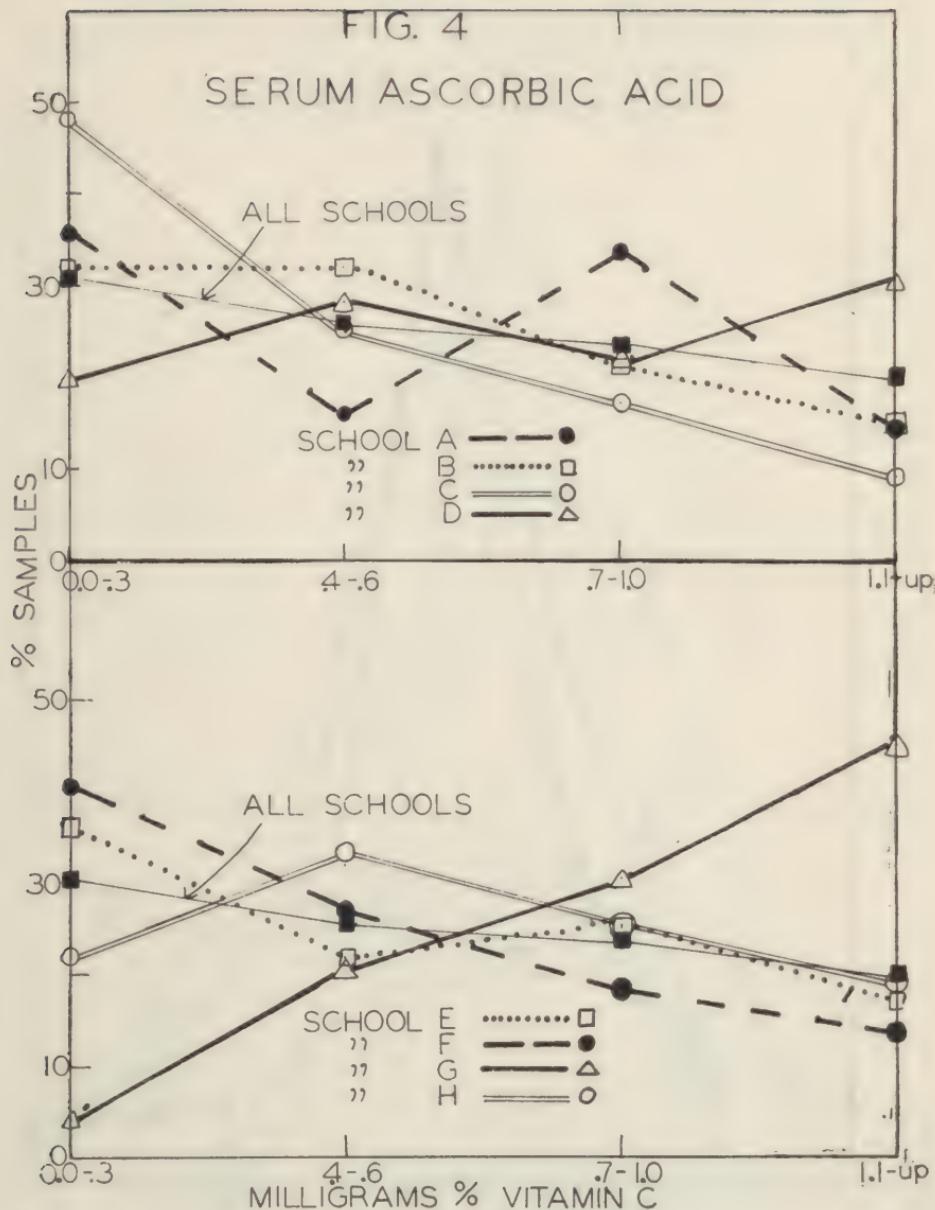


FIG. 5
SERUM RIBOFLAVIN

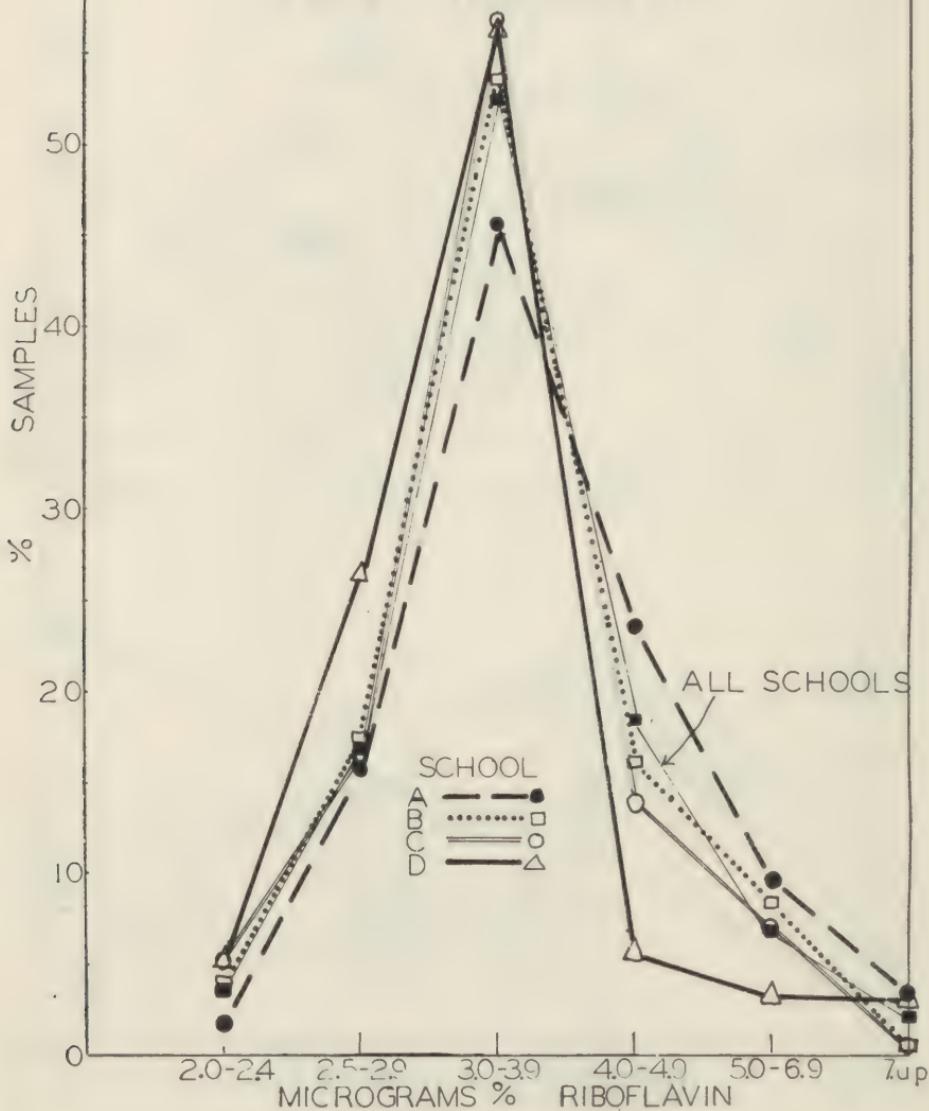


FIG. 6
SERUM RIBOFLAVIN

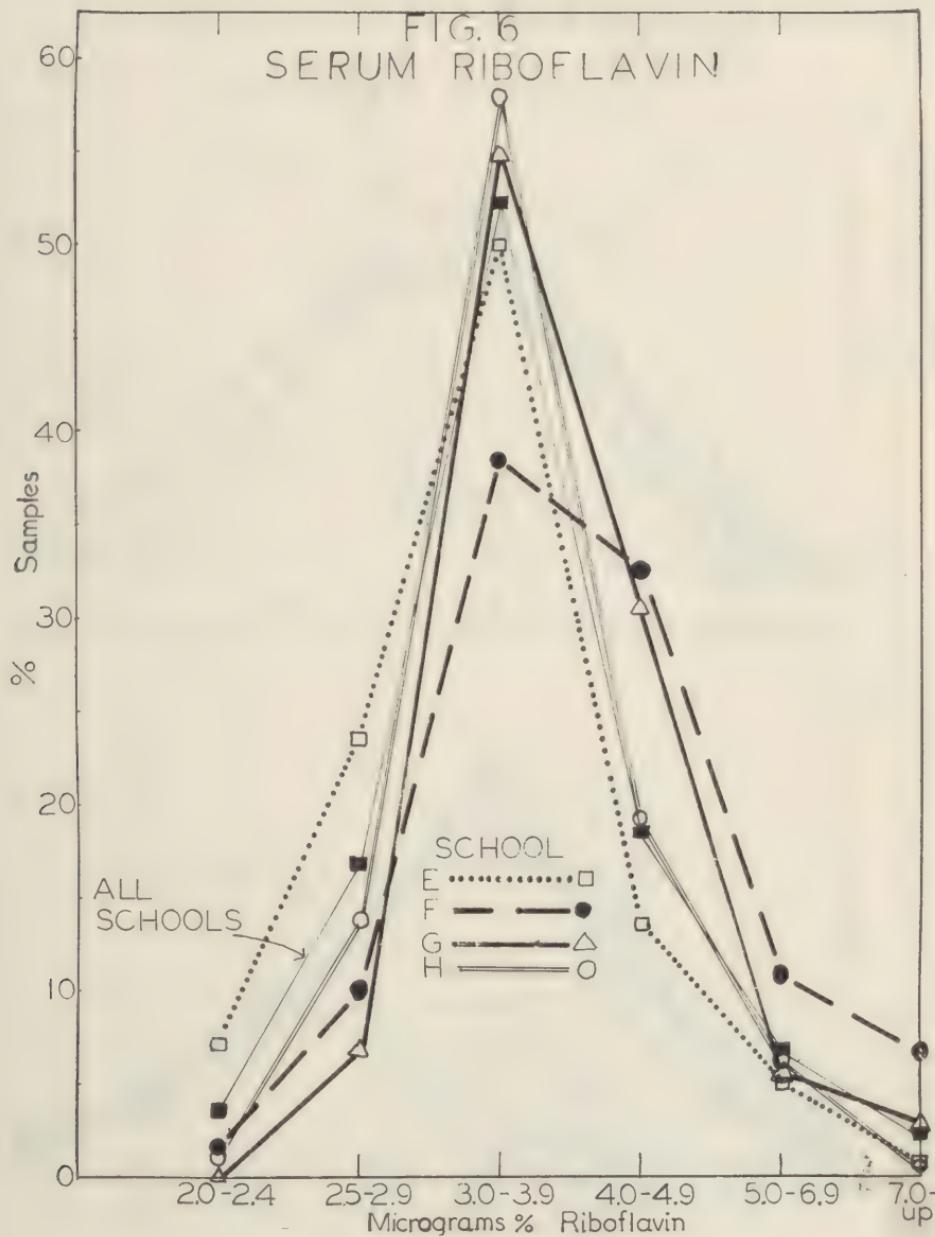


FIG. 7

SERUM PROTEIN

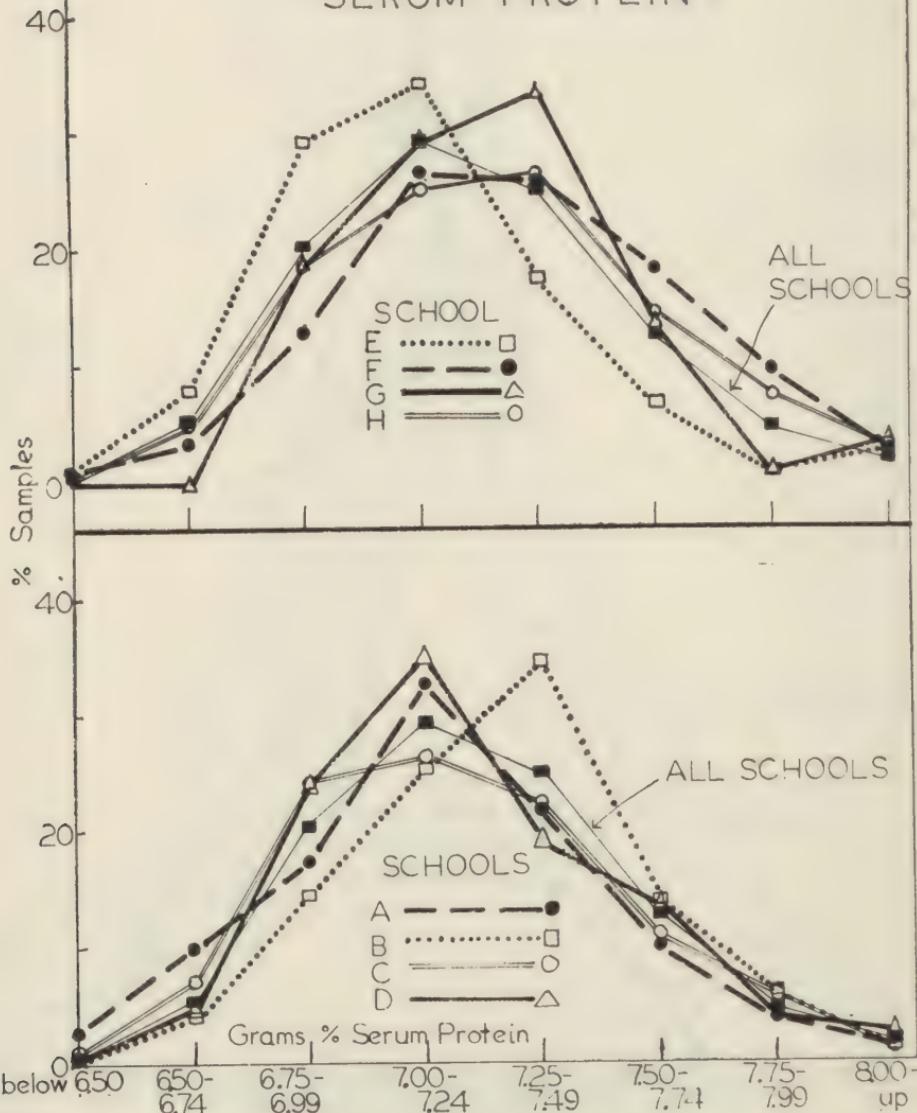


FIG. 8

HEMOGLOBIN VS AGE

15.0

14.5

14.0

13.5

13.0

12.5

18-19

17

16

15

14

13

12

AGE IN YEARS

Males- All Schools

(13)

(14)

(15)

(16)

(17)

(18)

(19)

(20)

(21)

(22)

(23)

Females- All Schools

(13)

(14)

(15)

(16)

(17)

(18)

(19)

(20)

(21)

(22)

(23)

() = Number in Group

FIG. 9

HEMOGLOBIN VS AGE

15.0

14.5

14.0

13.5

13.0

12.5

18-19

17

16

15

14

13

12

AGE IN YEARS

Males- All Schools

(13)

(14)

(15)

Males- School A

(16)

(17)

(18)

Females- School A

(19)

(20)

(21)

(22)

(23)

(11)

(12)

(13)

(14)

(15)

(16)

(17)

(18)

(19)

(20)

FIG. 10

HEMOGLOBIN VS. AGE

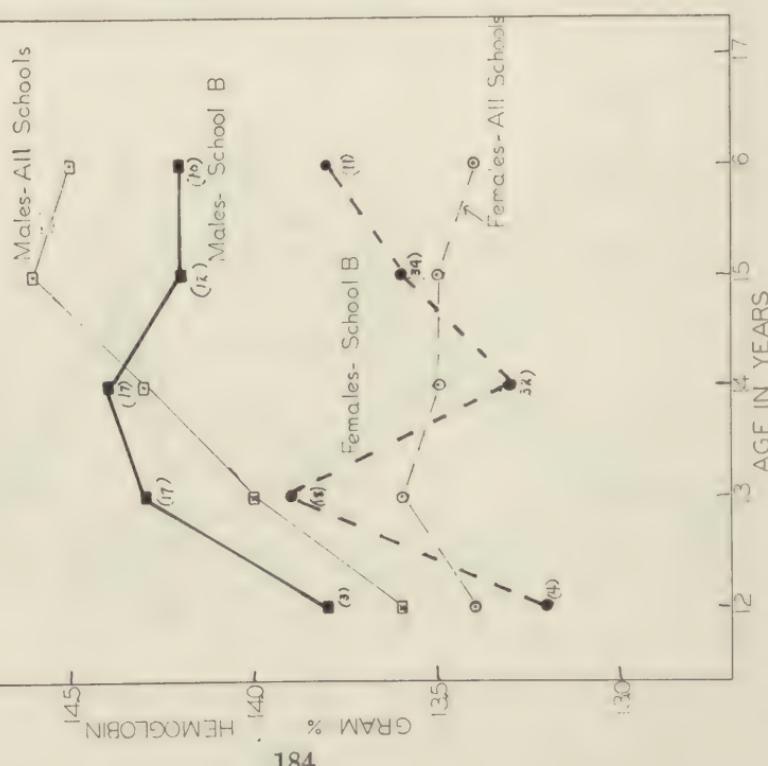


FIG. 11

HEMOGLOBIN VS. AGE

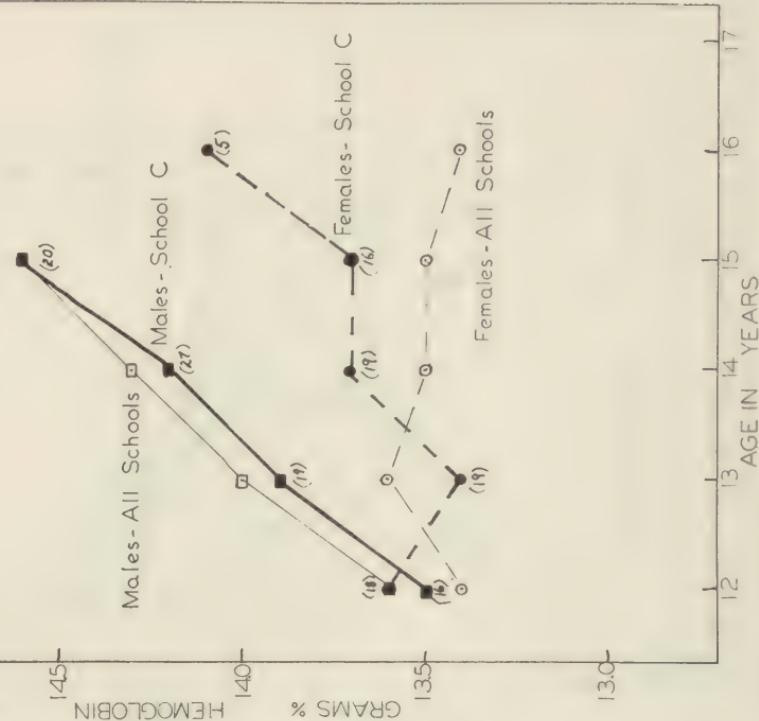


FIG. 11

HEMOGLOBIN VS. AGE

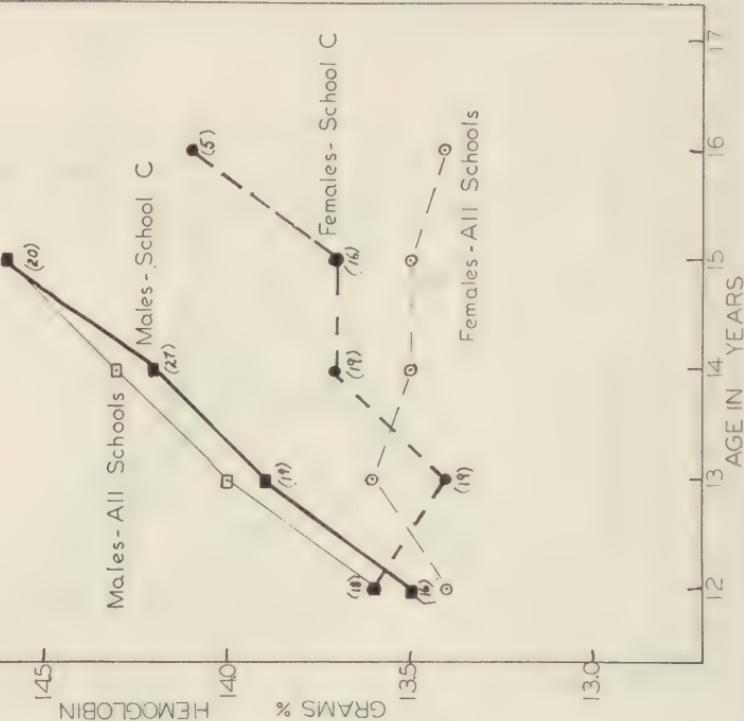


FIG. 12

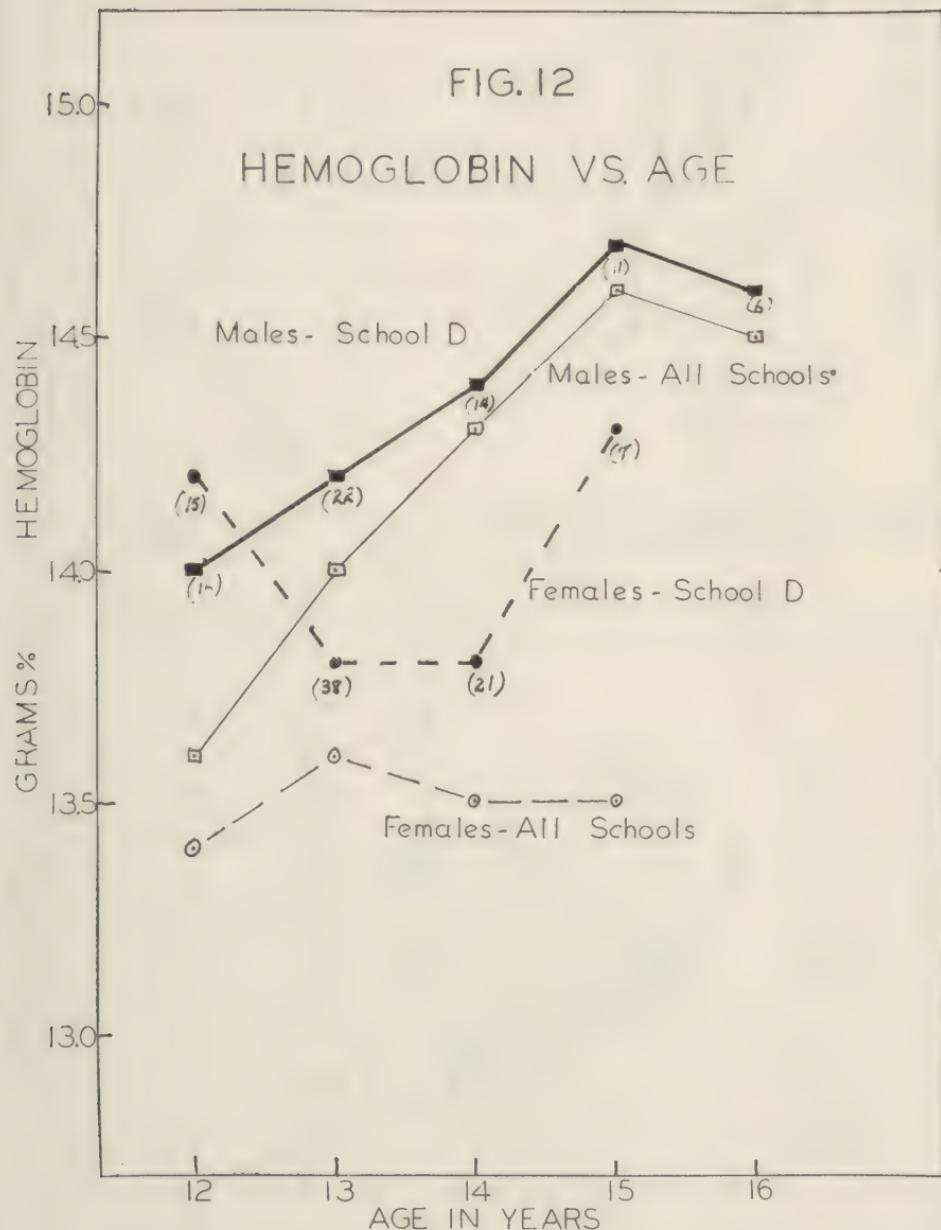


FIG. 14
HEMOGLOBIN VS. AGE

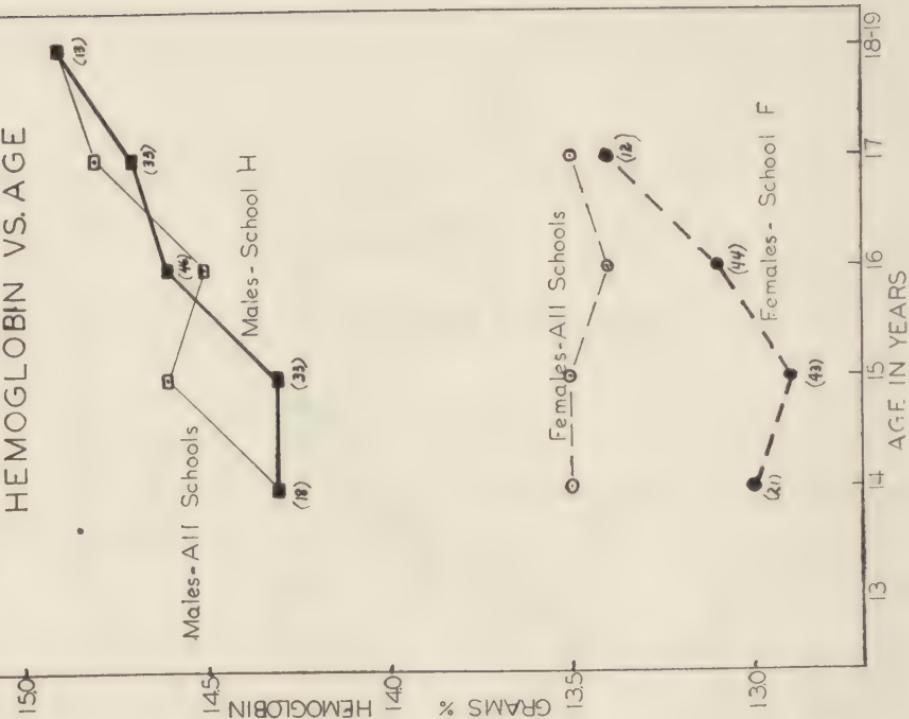


FIG. 13
HEMOGLOBIN VS. AGE

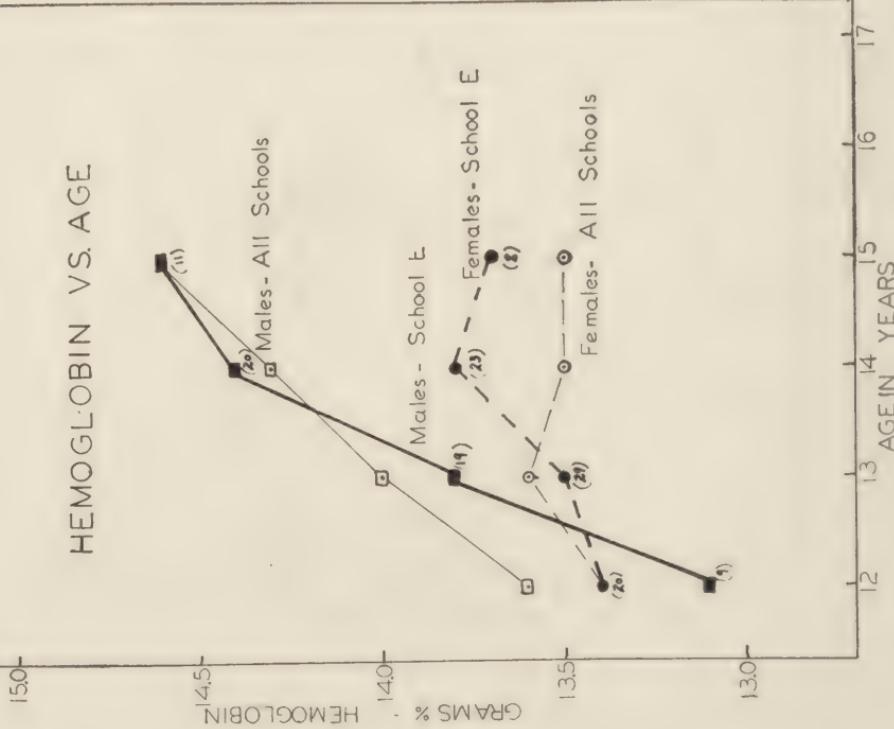


FIG. 16
SERUM PHOSPHATASE VS. AGE

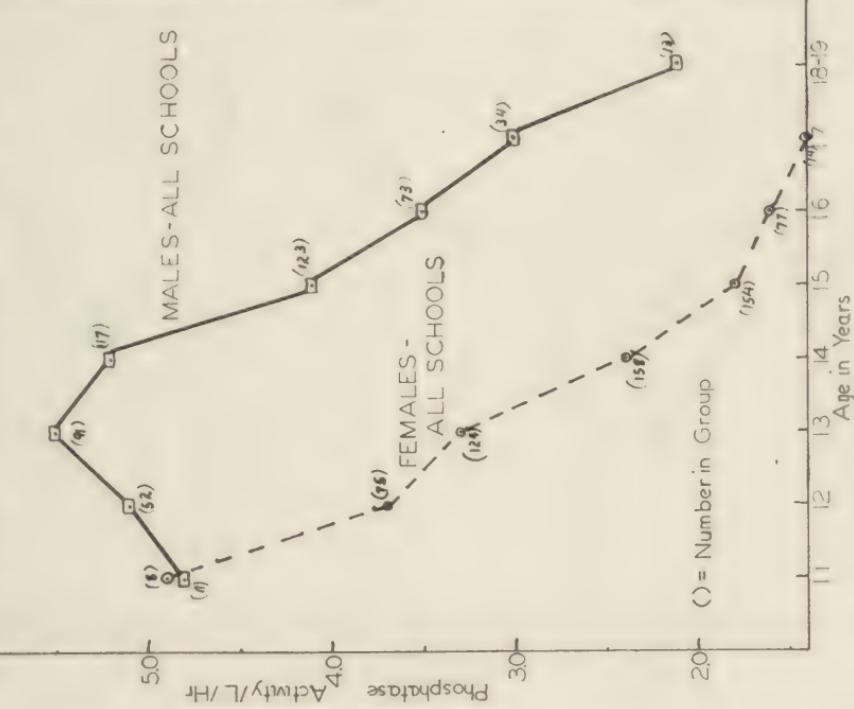


FIG. 15
HEMOGLOBIN VS. AGE

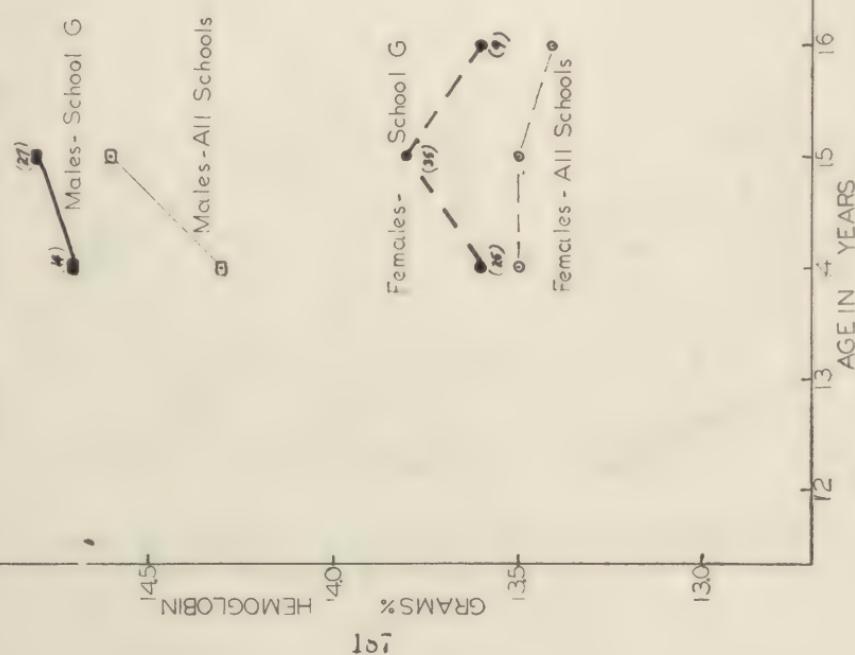


FIG. 18
PHOSPHATASE
VS AGE

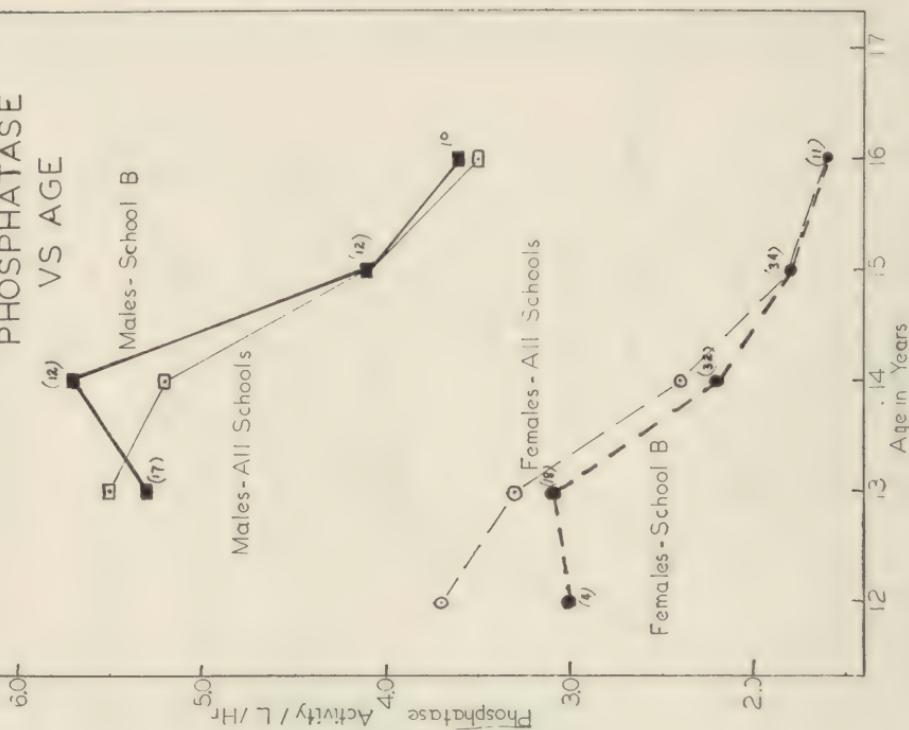


FIG. 17
PHOSPHATASE VS. AGE
Males - School A

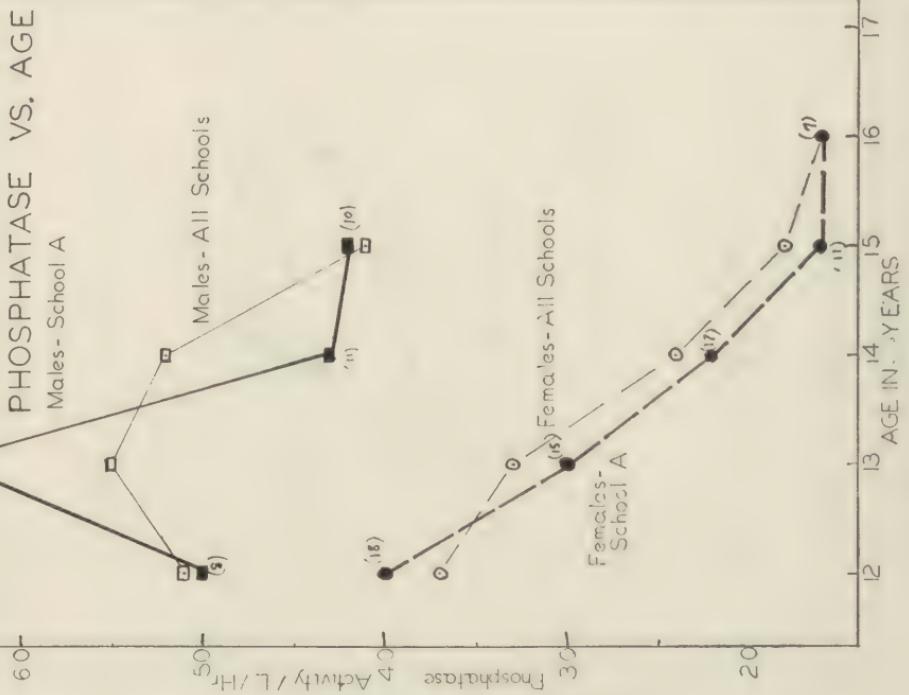


FIG. 19
PHOSPHATASE VS. AGE

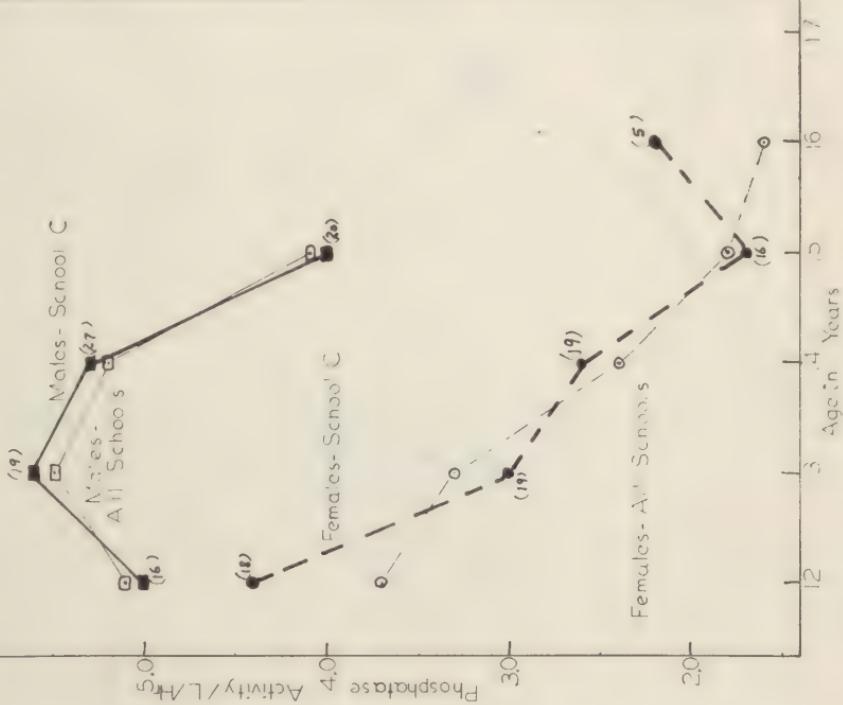
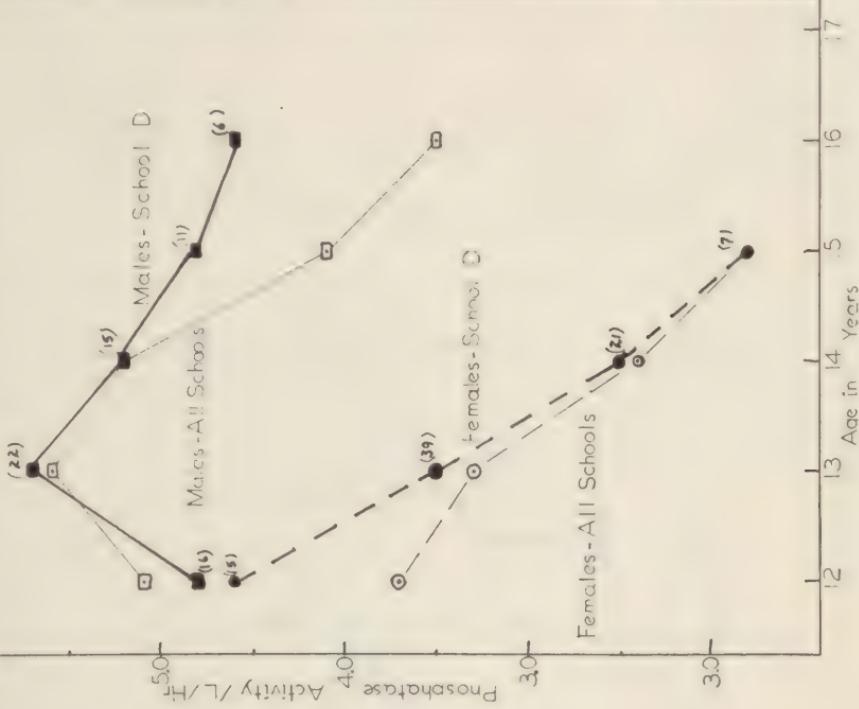


FIG. 20
PHOSPHATASE VS. AGE



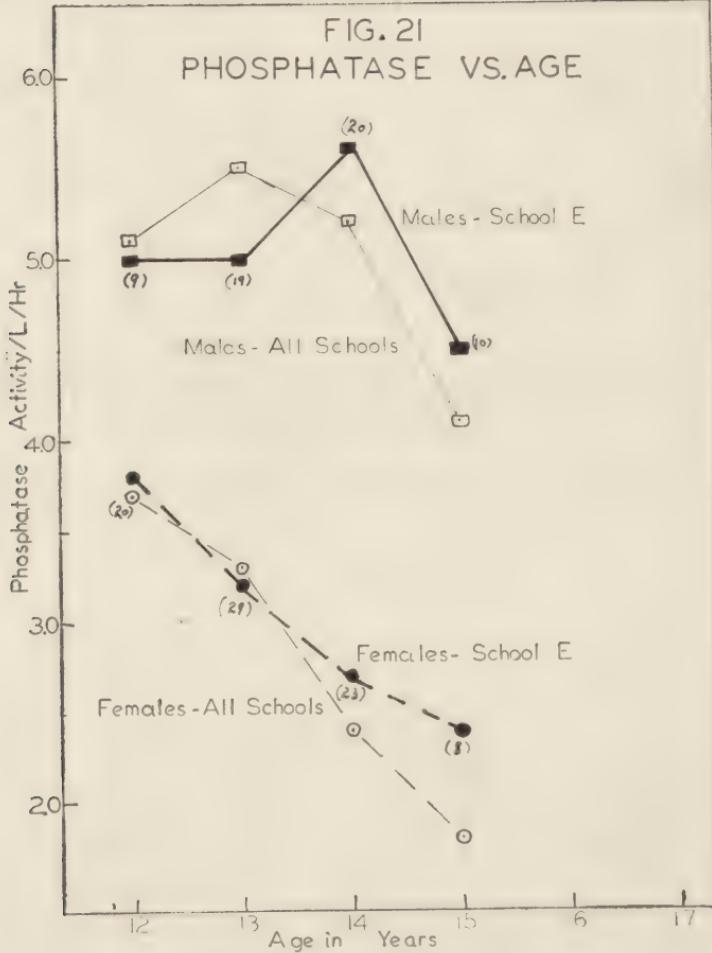


FIG. 22

PHOSPHATASE VS AGE

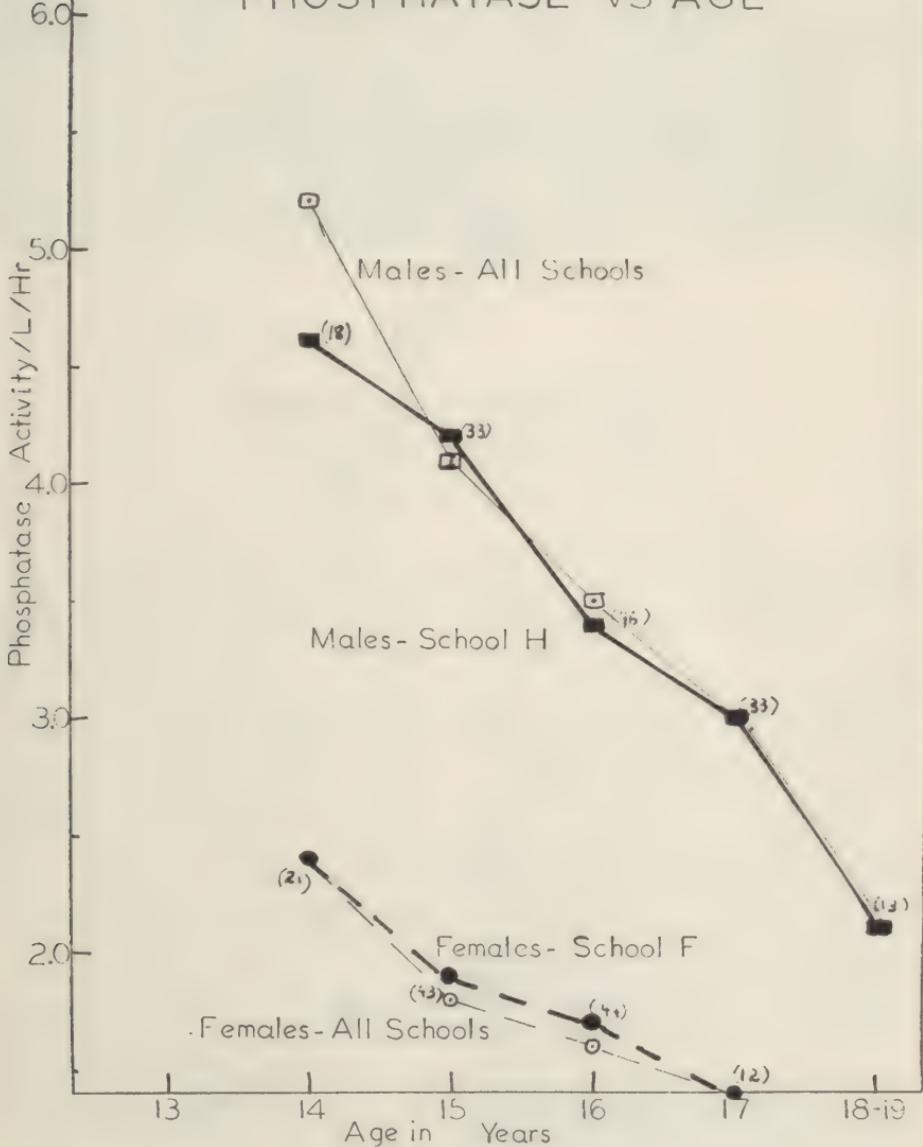
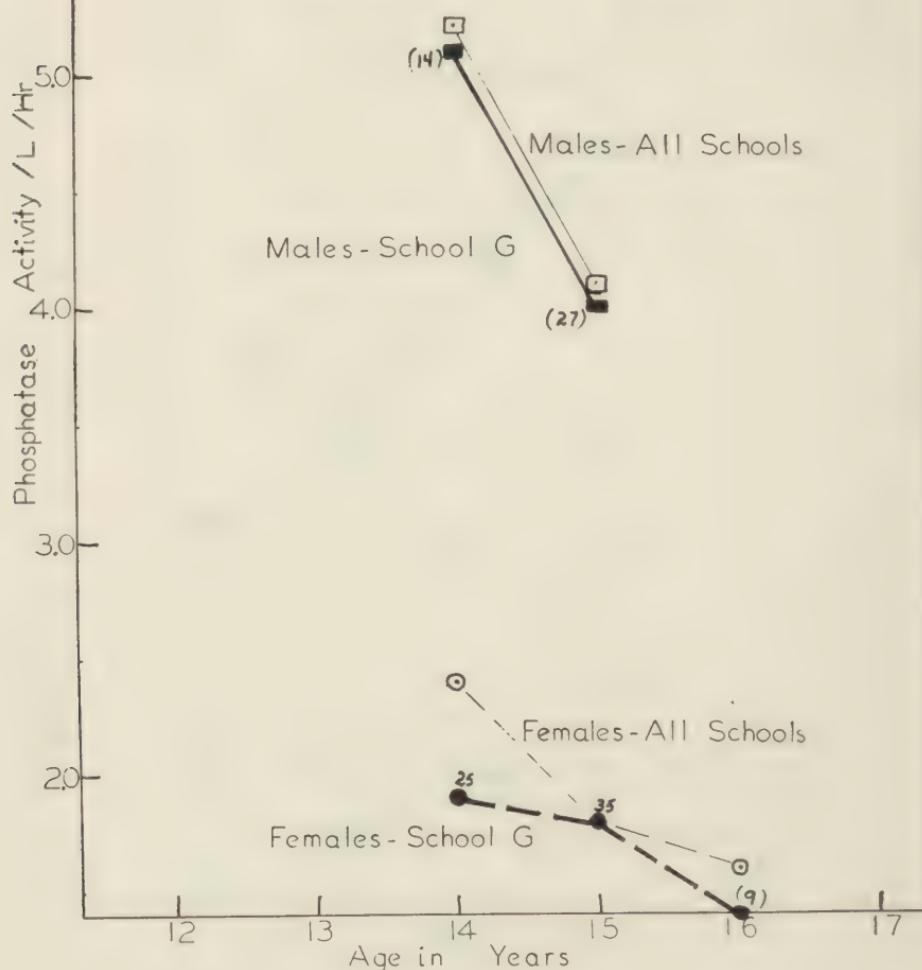


FIG. 23

PHOSPHATASE VS AGE





Advertising and Food

By Otis A. Kenyon

Chairman of the Board, Kenyon & Eckhardt

AMONG students of nutrition, there are probably more sceptics of advertising than in any other group of society.¹ Some individuals have even gone so far as to claim in public print that advertising is largely responsible for the shortcomings in our modern diet. In fact, it has been said that the public's preference for vitaminless bread and other foods denatured by processing is the result of powerful advertising.

In the minds of such people, advertising is sufficient to condemn any food, irrespective of its virtues. It would be just as sensible to say that speech is an evil force because it is used sometimes by orators to

deceive the public or that printing is a public menace because it is used sometimes for vicious propaganda.

It is interesting that nobody disputes the power of advertising in reaching the masses of people economically. Our nutritional critics substantiate this claim more than anybody else. In fact, no real advertising man would be so bold as to claim that advertising has forced people to eat what they should not have, and by nature, don't want. Yet this is precisely what some of our critics have charged.

The surprising thing is that since the critics of advertising have such an unholy regard for the power of advertising, it has not occurred to them to use it for furthering their own ends.

¹ This article has been written in rebuttal to one prepared on advertising and food by James Rorty, and published in "Nutrition in Review", the 1945 report of the New York State Joint Legislative Committee on Nutrition.

Under the stress of the war, many things were accomplished that under peacetime conditions seemed practically unattainable, and advertising played an important part in making many of these accomplishments possible.

Lessons of the Draft

When the draft forced us to realize that there was something decidedly wrong with the American diet because of the large number of draftees who were below requirements for military service, it was realized something had to be done—and fast.

It was evident that millions of people were improperly, and many times, inadequately, fed. It might be mentioned in passing that the worst spots in the country were those where advertising had the least circulation and, therefore, the least effect.

Nutritionists had been conscious of these dietary defects in a qualitative way for many years. They simply had not realized the magnitude of the damage that had been done to the youth of our country. For years, they had been writing and lecturing, and it was natural that they thought substantial progress was being made in combatting the situation. That is why the facts revealed by the draft came as a shock to the profession. In fact, the situation was so appalling that a National Nutritional Congress was called in May, 1941. This Congress was attended by public spirited physicians, nutritionists, dietitians, food manufacturers and others interested in the effect of nutrition on the national health.

After an appraisal of the situation, a very simple nutritional program was organized by which people were urged to eat regularly certain amounts of a variety of foods according to a routine program. It was expected that the combined efforts of all of the organizations represented at the Congress would exert enormous power and produce an almost immediate effect on the habits of the public.

After a year of this type of operation which included editorials in newspapers and magazines as well as feature articles, progress was disappointingly slow. Manufacturers were then called to Washington and requested to donate advertising space and the talents of their advertising writers to promote the program, and it was not until then that any substantial progress in penetrating the consciousness of the public was made.

Advertising Campaigns

At last the Government began to experience the power of advertising and proceeded to utilize it for promoting its programs of every kind. First and foremost, the selling of War Bonds and establishment of routine buying through payroll deduction was promoted. In addition, programs were instituted such as salvage of fat, paper and metal, and the recruiting of personnel for the Merchant Marine.

This last is an interesting example. The usual way of seeking recruits was to display attractive posters in all post offices and public places. This method was creating no appreciable influx of men. A small amount of money was appro-

priated for an advertising experiment. It worked so well that a regular advertising appropriation was made and even before it was spent, the facilities for handling the man power were so overtaxed that the advertising had to be temporarily discontinued.

Advertising is a success where other mediums of communication fail because it lures people who are inherently not interested in the subject to read and learn something to which they were previously completely indifferent.

Wherever new ideas are to be promoted and the knowledge of the public increased—advertising, by using sound psychological methods, can force these new habits of thought into the public consciousness.

During the war there were so many tasks for advertising in connection with the many Government programs that it was found necessary to organize an Advertising Council with headquarters at Washington to coordinate the activities and make the most effective

use possible of the facilities put at their disposal by the advertisers of the United States.

The operation of the Advertising Council during the war accomplished with such brilliance the tasks that were put before it that the Government not only commended it highly for its record, but urged the continuance of the organization into the times of peace, and as recently as April 28, 1947, Mr. Truman and other high officials of the Government publicly commended the Advertising Council upon its fifth anniversary for the work it had done in promoting Government programs.

The point we wish to make is that nutritionists, instead of criticizing and combatting advertising, should use it. They should formulate plans which they think desirable for the education of the public, make them simple and easy to understand, and then employ regular paid advertising which may be donated by public spirited advertisers to put their messages over.

America Can Prevent Goiter

By Thomas C. Desmond¹

Chairman, New York State Joint Legislative Committee on Nutrition

SIMPLE goiter—the disease most easily, quickly and cheaply prevented—is once more on the march. Throttled a quarter of a century ago, the insidious thyroid disorder is once more literally at our throats. "While we have gone forward on many parts of the nutrition front," reports Dr. Frank G. Boudreau, white-haired chairman of the National Research Council's Food and Nutrition Board, "we have not been successful in preventing the enemy, goiter, from filtering through the rear."

Some authorities estimate that 5,000,000 Americans are afflicted with the insidious glandular ailment. The figure may be too low—or too high. Goiter, being a non-contagious disease, need not be reported by physicians; as a result, case totals lack the documented accuracy of a C.P.A. audit.

But this we do know: Goiter specialists testify their case loads are soaring like stocks in a bull market. Public-health officials are alarmed. The American Medical Association and the U. S. Public Health Service recently sent their top experts to meet with a special committee set up by the American Public Health Association to study means of reawakening the country to the peril of goiter and to the simple way we can stamp it out permanently.

The salt you sprinkle in your soup, pour on your meat and salad, and perhaps a bit self-consciously shake on your water-melon and grapefruit, holds the key to wide-scale prevention of the glandular disorder. Salt, before it is refined, contains iodine. The thyroid gland needs iodine to function properly. Medical men emphasize that if iodine is restored to all table salt, millions of Americans now and for generations to come will be protected from goiter.

The principle involved is virtually identical with that which led our country to require the "enrichment" of bread. Millers in processing wheat were extracting large portions of essential nutrients. Scientists appealed to the millers and bakers to restore the vitamins and minerals lost in processing wheat. By 1942, one-third of all bread was enriched. Then a War Food Administration order required fortification of all flour and bread. Today we must call upon our salt manufacturers either to "iodize" all table salt voluntarily or be compelled by Federal regulation to restore the mineral they are stripping from our salt.

The tragic resurgence of goiter is a disgraceful monument to our national neglect. Twenty-five years ago we had all the information we needed to crush goiter for all time. Scientists charted for us the precise course we needed to follow to

¹ Reprinted from *Ladies' Home Journal*, Nov. 1946.

have a goiter-free country. Teachers, editors and radiomen were enlisted to help spread the tale: "To prevent goiter, use iodized salt." In a few states, iodized wafers were distributed to children, and iodized salt was used in many homes for a few years. But the shrill voice of publicity has faded away. A new generation has arisen wholly unaware that goiter lurks in every home, waiting for us to lower our guard. Our children are ignorant of the combative qualities of iodized salt. And many of the older folks, not hearing much talk in recent years about the subject, thought the "epidemic" must have passed away and therefore they have failed to protect themselves.

Today we must awaken to the menace of goiter, which can lead to the birth of feeble-minded, deformed babies, the draining of vitality from expectant mothers, the weakening of adolescents and the end of the working capacity of family breadwinners. Goiter strikes five times as frequently among women as among men, taking an especially heavy toll of babies, adolescent girls and pregnant women. It blankets large areas of 21 states, from the Pacific Coast through the northern commonwealths to Illinois, Michigan and Ohio and over to Pennsylvania and West Virginia. No state is goiter-free. And, unless we protect our families by using iodized salt, no one of us can safely say, "Goiter will not strike in my home."

What Is Goiter?

Simple goiter is an enlargement of the thyroid gland which strad-

dles your windpipe between your collarbone and Adam's apple. One of the key regulators of your growth and development, this gland governs the rate at which your body uses food materials, especially energy foods, and helps to make your entire glandular system synchronize as smoothly as the pistons of a brand-new car. The gland secretes into your blood a substance known as thyroxine, which normally contains 65 per cent iodine. That is why iodine is so important to your system. Since we lose a large part of our iodine supply in sweat and wastes, we need to refuel daily. While it has not been glamorized as have the vitamins, iodine is just as essential to your well-being.

If you don't get your daily requirement of iodine through your food or water, the thyroid cells become overactive and, as though seeking to compensate for the deficiency, the gland swells up. Many changes may occur when this human carburetor doesn't receive sufficient quantities of the proper fuel for release into the human motor. Usually basal metabolism takes a sharp plunge, causing lower body temperature and difficulty in keeping warm. In the young, mental, physical and sexual development may become stunted. In adults, mental efficiency may become impaired; skin and hair become dry; the face may swell; and the body becomes an easy target for hard-hitting microbes and viruses. Mothers may give birth to cretins.

In many cases victims are fortunate; they may live a normal life totally unaware they have goiter.

Others, about 15 to 20 per cent of all who have simple goiter, develop toxic conditions which may require prolonged treatment with X rays, thiouracil, radioactive iodine or delicate operations.

Until our Government acts, you can protect yourself. If you have goiter, see your doctor; do not attempt to medicate yourself. But if you do not have goiter and want to make certain you will be free from this disease, use iodized salt daily.

Why Do We Lack Iodine?

Why do so many of us lack the iodine we need? The blame rests largely on the glaciers which many years ago crunched their way down across the continent and left in their wake soil and water depleted of the precious mineral. Were it not for this geologic robbery, our water and our fruits, vegetables and meat would provide ample quantities of iodine, and goiter would be as rare as modesty in a politician. Today, cod-liver oil and sea foods are the only rich sources of iodine that we can count upon in our food. And since we do not regularly consume either cod-liver oil or salt-water fish daily, we must turn to another source of iodine: salt.

The average American consumes six pounds of salt a year as a condiment, and as much more goes into the preparation and preservation of his food. It is part of our everyday meals. We take for granted that the salt shaker will be on the table when we dine. If in our salt shakers were infinitesimal amounts of iodine, the

problem of goiter would be considerably lessened.

Dr. George M. Curtis, renowned researcher, has found out that we need daily one microgram of iodine per kilogram of body weight for basal needs, one microgram for our normal activity, and one more for a reserve for unusual exercise, emotional stress, pregnancy or menstruation. One part of sodium iodide to 5000 parts of salt will provide us with the iodine we need, with ample reserve for the iodine we lose in sweat and other wastes. This is about enough iodine to cover the point of a pen-knife.

In the natural brine that is pumped from wells often many thousands of feet deep, in the rich salt deposits that lie buried deep in the earth, and in the salt of ocean water there is usually a substantial quantity of iodine. But when the manufacturer evaporates the brine in huge "vacuum pans" which stand 45 feet high and look like giant hand grenades, the iodine is stripped from the salt. Nothing but pure white powdery sodium chloride is left. Manufacturers can easily restore the iodine. They have the know-how. To restore the iodine, they need add potassium iodide. The cost is 1/20th of 1 cent per pound of salt. To prevent decomposition of the iodine, salt producers add a potent mixture of theosulphate and calcium hydroxide, or a small amount of calcium stearate. The cost per package is infinitesimal and need not lift the price of salt at all. So-called iodized salt is being sold today at the same price as regular

—or, shall we say, “stripped” salt.

Alexander Falconer, a salt industry representative, points out, “No salt manufacturer can say that he will furnish only iodized salt, because if the public demanded salt without iodine they would simply buy from another company. There must be agreement, but it does not seem possible that all companies will agree.”¹

Today many of the same “hunger fighters” who successfully fought pellagra and who led the campaign for enrichment of bread are leading the drive for restoration of iodine to all table salt. Dr. Russell M. Wilder, famed Mayo Clinic expert and member of the American Medical Association Council on Foods and Nutrition, says, “We consider it the duty of the Government to explore all ways open for iodization of salt.” Dr. W. H. Sebrell, who was assistant to Doctor Goldberger, conqueror of pellagra, and who while still in his thirties achieved international fame for pioneer research, favors iodization of all table salt and the dropping of the word “iodized” from the package labels as being misleading. Since natural salt contains iodine, it is incorrect to call salt to which iodine has been restored “iodized.” Doctor Sebrell points out, “Renewed education for the prevention of goiter is costly and does not last.”

¹ Mr. Alexander Falconer, Secretary of the Salt Producers Association, informs the writer that a more accurate statement of the industry's position is, in substance, as follows: The industry is glad to work with public health groups to control goiter. But the producers believe it would constitute a violation of Sherman and Clayton anti-trust acts and restraint of trade if they

The Drama of Goiter

Man first used iodine to combat goiter many thousands of years ago. To treat “tumors of the neck,” the ancient Chinese found sea sponge effective. They didn't know why it was helpful, but the sponge was rich in iodine. This treatment was lost in antiquity, and later cures were alleged to be effected by touching the king's hand. Some thought the goiter served a cosmetic function, since it gave “grace to the contour of the neck.”

Iodine was not discovered until Napoleon Bonaparte, in 1811, cut off from his supply of Chilean salt-peter which he needed for gunpowder, ordered his scientists to find a substitute. A French chemist, Courtois, accidentally isolated the mineral after he noticed black scales on the side of his salt-peter vat in which was the ash of seaweed which had been burned.

But iodine was not connected with goiter therapy until 1820, when a brilliant physician in goiter-ridden Geneva, Switzerland, Doctor Coindet, made a remarkable guess. Reading of the Frenchman's discovery, he deduced that Courtois had found the element that had proved so helpful to the Chinese. He hastened to test his theory. Large goiters of long standing disappeared with incredible speed after application of iodine. The word spread. Hundreds of patients lined up in the

agreed among themselves to produce only table salt containing .01 potassium iodide. In addition, they believe that since the housewife is the ultimate dictator of what is made, sold and used in the food industry, the solution lies “in constant education by the medical and health bodies.” They are also opposed to Federal or state legislation requiring fortification of salt.

cobblestone street before his door. The town was alive with excitement. People took to carrying little bottles of the magic element hung around their necks as charms.

But the use of iodine soon fell into disrepute. Physicians in their enthusiasm for the magic drug overdosed their patients. Mishaps occurred. Simple goiters developed into toxic goiters. Patients died. In the Academy of Medicine in Paris, learned physicians stood up and condemned the use of iodine. Even the great Kocher warned against it. Iodine therapy was abandoned.

Pasteur's discovery of germs as the cause of disease turned the medical profession to a search for some microbe as the goiter producer. Toward the close of the nineteenth century, iodine was discovered in the thyroid gland. Medical leaders began to think that maybe Doctor Coindet may have been right after all.

In 1909, the year Louis Blériot astounded the world by flying 31 miles across the Channel in 37 minutes, there came a fantastic though little-known development in the age-old struggle against goiter. Brook trout in the hatcheries of the Blooming Grove Hunting and Fishing Club in Pennsylvania were dying, stricken with cancer of the thyroid. The State Fish Commissioner called in a young physician, Dr. David Marine. His examination indicated the killer was not cancer. It was goiter! He dropped minute quantities of iodine in the hatchery waters. The results were dramatic. The fish lived and grew nor-

mally and healthfully to present a living target for many a fisherman's hook.

Doctor Marine continued to study the puzzling glandular disease. He became increasingly convinced that iodine could prevent goiter. In 1916, Doctor Marine was lecturing in a medical college in Cleveland. His eyes glinted and he clenched his hands as he hammered home the point, "Goiter is the easiest-known disease to prevent. Every physician should be held criminally responsible for the development of goiter among his patients."

The students dutifully scribbled his words into their notebooks. That is, all except a third-year student named O. P. Kimball. Young Kimball's imagination soared under the impetus of his teacher's challenging remarks. When the lecture ended, he bounded up to his teacher. "Why, sir," he demanded with youthful enthusiasm, "isn't something done to prevent goiter now?" Doctor Marine was proud that he inspired such a reaction in a pupil. He talked at length with Kimball. They decided to see what could be done. A wide-scale demonstration, not on fish or fowl but on humans, was needed. A few weeks later they secured an invitation from the Board of Education at Akron, Ohio, to test their theory.

The teacher and his energetic pupil launched a four-year epoch-making trial.

The two goiter fighters examined 5000 girls in grades five to twelve. Half of them were found to be goitrous. A typical goiter-ridden pupil was twelve-year old Mary

Graham, a dull, nervous, weak child in the fifth grade. They exacted promises from Mary and 2000 of her fellow pupils that they would take two grams of sodium iodide twice yearly. Four years later, in 1920, Doctor Marine and Kimball (by this time an M. D. in his own right) checked up on their "guinea pig" youngsters. Mary's thyroid had decreased to normal size; her nervousness had disappeared; her grades now showed a string of A's and B's. She was well and active and bright. Even more heartening was the fact that of all those who took the iodine, less than $\frac{1}{2}$ of 1 per cent developed goiter, two out of three of those goitrous pupils who had taken the iodine no longer suffered from goiter. And conversely, of those pupils who did not have goiter at the beginning of the experiment and did not take the iodine, one third had developed the ailment. Furthermore, of over 20,000 grams of sodium iodide given to the girls, the only untoward reaction was an iodine rash in seven cases.

Doctors Marine and Kimball had clearly established that the cause of simple goiter is deficiency in iodine and that the disease could be prevented easily, quickly, safely and cheaply.

While working on the Akron experiment, another incident confirmed this belief. Doctor Marine had received a letter from John Ronayne, a farmer in Pemberton Valley, British Columbia, appealing for advice. Mr. Ronayne had heard of Marine's work on the trout and hoped he could advise him. It seems that every woman,

child, calf, colt and mare in the valley had goiter. Litters of pigs were born hairless, and eggs of chickens, ducks and turkeys would not hatch. Marine advised the settlers to try iodine. By 1922 no case of goiter was found in man or beast in the valley.

Shortly after the Akron experiment had received widespread publicity, iodized salt was made compulsory in the canton of Appenzell, Switzerland. After a lapse of three years no congenital goiter was found among children whose mothers had the salt during pregnancy. This compared with a 50 per cent goiter rate among newborn babies prior to the adoption of the prophylactic measure. In other Swiss cantons chocolate-coated iodine tablets were distributed to school children, nearly 100 per cent of whom were goitrous. Whether iodized salt or wafers were used, results were sensationaly effective.

Many communities in the United States launched antigoiter campaigns. In Michigan, analysis of water supplies showed clearly that communities having a higher iodine content had fewer goiter cases. In Houghton, Michigan, 64.4 per cent of the children had distinct thyroid enlargements; its water was iodine-free. In Macomb County, where the iodine content was highest, 8.7 parts per billion, the goiter rate was only 26 per cent. Sixty-five thousand children were examined in Michigan, and one out of every three was found to be goitrous. An Iodized Salt Committee headed by Dr. D. Murray Cowie, of the University of Michigan, was formed to

convince salt manufacturers they should restore iodine to salt. Many Michigan salt producers were suspicious, feared loss of trade, refused to cooperate. But when the committee went to one manufacturer and told him the simple connection between goiter and iodized salt, he promptly agreed to "enrich" his product. His daughter had died of goiter. With this break in their ranks, the other manufacturers rushed to fall in line. Thus in 1924 began the first wide-scale "fortification" of a basic staple food. Newspapers, radio stations and schools joined the campaign. By the end of 1924, 75 per cent of Michigan families were using iodized salt regularly.

Checking up on results four years later, in 1928, Doctor Kimball found that the incidence of goiter had dropped in Wexford County from 54.6 per cent in 1924 to 17.2 per cent in 1928; in Midland, from 32.7 per cent to 8.8 per cent; in Grand Rapids, from 30 per cent to 9 per cent. Not a single child was found who showed the slightest ill effect from the use of iodized salt.

In 1936, 61,000 children were examined in Michigan and it was discovered that the goiter rate had dropped from 38.6 per cent in 1924 to 8.2 per cent; 97 per cent of the iodized-salt users were free of goiter! The study sharply disclosed the value of the fortified salt. In Houghton High School goiter struck 12.2 per cent of the children, but in Calumet High School, only 30 miles away, 28.7 per cent were goitrous. Why? asked the indomitable Marine-Kimball team. They found their

answer on the relief rolls. Calumet, a mining town with two-thirds its population on relief between 1932-35, had furnished non-iodized salt to relief families. The thyroids of the poor went begging for iodine; the only source of food iodine had been closed.

In 1937 a goiter study in Cleveland disclosed that while only 9 per cent of iodized-salt users showed any signs of goiter, goiter was more than four times as prevalent among those who didn't use the salt. The survey revealed, also, an 18.5 per cent general incidence of goiter among all the children. Why was goiter twice as prevalent in Cleveland as in Michigan? Because some doctors there, like the frightened medical men of the 1850's, had warned against iodine.

When the returns on the 1936-37 Michigan and Cleveland surveys were analyzed, public-health officials promptly warned that the country must once again attack goiter. But the country was busy with a "recession," with unemployment, a New Deal, the rise of Hitler, and spared no time for the doctors who were calling for swift action. The states ignored the cry. Uncle Sam never heard it.

Marine and Kimball continued to advocate iodization of salt. Their voices went unheeded. As years went by, mothers forgot how beneficial the iodized salt had proved, and children grew up who had never been taught the value of iodized salt.

Ten years have elapsed. Ten years in which iodine deficiency has had a chance to gain a new stronghold on our necks. Para-

phrasing the famed Gable-Garson movie slogan, we might say: Goiter is back and the United States has got it. We can get rid of it quickly if once and for all we take the one necessary step: iodization of all table salt.

The addition of 1 part sodium iodide to 5000 parts of salt will do the trick. The salt will cost the same and taste the same as present-day table salt, but will afford us the protection we need from goiter.

The National Research Council urges the use of iodized salt: "The requirement for iodine is small, probably about 0.002 to 0.004 milligrams a day for each kilogram of body weight. This amounts to about 0.15 to 0.30 milligrams daily for the adult. This need is easily met by the regular use of iodized salt; its use is especially important in adolescence and pregnancy."

Goiter-fighter Kimball says, "The entire country should have a natural salt containing 0.01 per cent potassium iodide or its equivalent. The term 'iodized' should be eliminated at once and emphasis should be placed on the use of a whole salt or natural salt to prevent food deficiencies. The need is for only one kind of salt, and this standardized so that it contains the important food elements which are found in natural unrefined salt. The prevention of

simple goiter will be then as nearly complete as any public-health measure can ever make it."

Soft-spoken, veteran leader of numerous public - health movements, Dr. Reginald M. Atwater, executive secretary of the American Public Health Association, testifying at a recent public hearing of my committee, urged iodization of all table salt, saying, "We feel we ought once and for all to solve this problem of simple goiter. It is too costly a matter to depend on having to sell each new generation on the idea of using iodized salt."

These are the voices of America's leading public-health experts. They are warning us: "Take action now or you will suffer." Dare we ignore this warning?

Here is a monumental challenge to the United States Food and Drug Administration: You can require the restoration of iodine in salt and wipe out simple goiter, or you can ignore the problem and be responsible for the suffering of millions.

There are 60,000,000 people who live in goiter-ridden, iodine-depleted states; there are 80,000,000 more Americans in the remaining states who have no assurance they are getting sufficient iodine in their food or water. Is it asking too much of our officials that they solve the goiter problem promptly? It can be done. It must be done.

APPENDIX A

80TH CONGRESS
1ST SESSION

H. R. 4211

IN THE HOUSE OF REPRESENTATIVES

JULY 15, 1947

Mrs. BOLTON introduced the following bill; which was referred to the Committee on Interstate and Foreign Commerce

A BILL

To amend section 301 of the Federal Food, Drug, and Cosmetic Act, so as to prohibit the introduction into interstate commerce of salt, in certain containers, not having a required content of iodides.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That paragraph (a) of section 301 of the Federal Food, Drug, and Cosmetic Act, as amended (U. S. C., 1940 edition, title 21, sec. 331), is hereby amended by inserting "(1)" after

"interstate commerce" and by striking out the period at the end of such paragraph and inserting a comma and the following: "or (2) of salt (sodium chloride) sold or to be sold in containers, containing three pounds or less of salt, the granules of which will pass through a number 20 United States standard sieve, unless such salt contains suitable iodides in a quantity equivalent to not less than seventy-five parts and not more than one hundred and fifty parts."

Sec. 2. The amendment made by this Act shall take effect one year after the date of the enactment of this Act.

APPENDIX B
STATE OF NEW YORK

No. 2

Int. 2

IN SENATE

January 8, 1947

Introduced by Mr. DESMOND—read twice and ordered printed, and when printed to be committed to the Committee on Finance

AN ACT¹

In relation to the apportionment and advance of moneys for school lunch programs, and making an appropriation therefor

The People of the State of New York, represented in Senate and Assembly, do not enact as follows:

Section 1. During the school year ending June thirtieth, nineteen hundred forty-seven, the commissioner of education is authorized to apportion and advance, from the moneys hereinafter appropriated so much thereof as may be necessary, to sponsors of non-profit school lunch programs, in accordance with the provisions of school lunch program agreements heretofore entered into by the state education department and such sponsors, pursuant to the provisions of an act of Congress entitled the "national school lunch act" (Public Law three hundred ninety-six, seventy-ninth Congress, approved June fourth, nineteen hundred forty-six) and an agreement between the United States department of agriculture and the state education department executed thereunder, dated June twenty-first, nineteen hundred forty-six, provided, however, that any such apportionment or advance made

by the commissioner of education shall be deemed a first instance payment by the state of New York to such sponsors.

Upon any additional federal appropriations or allocations being made available to the state of New York for the establishment, maintenance, operation or expansion of the several school lunch programs, now in effect, for the school year ending June thirtieth, nineteen hundred forty-seven, such additional federal appropriations or allocations shall be applied by the commissioner of education to the repayment of the apportionments and advances herein authorized and shall be deposited in the general fund of the state treasury to the credit of the local assistance fund as a receipt and such repayments of apportionments and advances shall be credited to the several accounts of such sponsors; provided, however, that nothing contained herein shall require any

¹ This bill became law, Chapter 10, Laws of 1947.

such sponsor to make repayments of any apportionments or advances authorized herein except from the proceeds of such additional federal appropriations or allocations as may hereafter be made available to the state of New York.

§ 2. The commissioner of education, subject to the approval of the director of the budget, is hereby authorized and directed for and on behalf of the state to make and sign all necessary or proper agreements to provide for such apportionments and advances, and repayments thereof, and to do and perform all necessary acts to effectuate the intent and purpose of this act.

§ 3. The sum of two million five hundred thousand dollars (\$2,500,000) or so much thereof as

EXPLANATION — Matter in *italics* is new; matter in brackets [] is old law to omitted

may be necessary is hereby appropriated out of any moneys in the state treasury in the general fund to the credit of the local assistance fund, not otherwise appropriated, and made immediately available to the education department for the purpose of carrying out the provisions of this act, including obligations incurred prior to March thirty-first, nineteen hundred forty-seven and obligations thereafter incurred during the period beginning April first, nineteen hundred forty-seven and ending June thirtieth, nineteen hundred forty-seven, payable on the audit and warrant of the comptroller on vouchers certified or approved as provided by law.

§ 4. This act shall take effect immediately.

APPENDIX C
STATE OF NEW YORK*

No. 2078

Int. 1851

IN SENATE

February 20, 1947

Introduced by Mr. DESMOND—read twice and ordered printed, and when printed to be committed to the Committee on Finance

AN ACT

To amend the education law, in relation to providing state aid for school lunches and school milk, and making an appropriation therefor

The People of the State of New York, represented in Senate and Assembly, do not enact as follows:

Section 1. The education law is hereby amended by inserting therein a new article, to be article twenty-c, to read as follows:

ARTICLE 20-C

SCHOOL LUNCH PROGRAMS

Section 579. Statement of fact and purpose.

579-a. Apportionment of moneys for school lunches and milk in elementary and secondary public schools.

579-b. Apportionment of moneys for school lunches and milk in certain elementary and secondary schools, other than public schools.

579-c. Limitation upon apportionment.

579-d. Payments of amounts apportioned.

§ 579. Statement of fact and purpose. It has been conclusively demonstrated by authoritative surveys and investigations that widespread malnourishment exists among the children of this state. This "hidden hunger" existing in childhood has been a major contributing factor to the development of many ailments in adult life and has resulted in large number of our youth being rejected as unfit for service in the military forces of our country. The serving of lunches and milk in our schools has been an effective means of combating this malnourishment. It has also served to encourage proper utilization of agricultural commodities, to aid farmers in long-term development of better domestic markets and to help farmers dispose of agricultural surpluses.

It is the purpose of this act to establish the provision of school lunches and milk as a permanent function of our state government and it is the intent of this act to

help give every school child access to a well balanced lunch.

§ 579-a. Apportionment of moneys for school lunches and milk in elementary and secondary public schools. There shall be apportioned and paid to each school district, for the purpose of contributing toward school lunches and milk the sums to be determined by the commissioner of education as follows:

The sum of four cents shall be allowed for each complete meal served, and the sum of two cents shall be allowed for each one-half pint of milk served, in each public elementary and secondary school in such district entitled thereto, on a basis of the average daily number of meals or one-half pints of milk served to pupils in such district.

§ 579-b. Apportionment of moneys for school lunches and milk in certain elementary and secondary schools, other than public schools. There shall be apportioned and paid to each elementary and secondary school of the state operated on a non profit basis, other than public schools, for the purpose of contributing toward school lunches and milk, the sums to be determined by the commissioner of education as follows:

The sum of four cents shall be allowed for each complete meal served, and the sum of two cents shall be allowed for each one-half pint of milk served, in each such school entitled thereto, on a basis of the average daily number of meals or one half-pints of milk served to pupils in such school.

§ 579-c. Limitation upon apportionment. No portion of the

moneys so apportioned as provided in this article shall be expended to provide more than one meal for the same child on the same day. No school district or school shall, because of the receipt of payments under this article, decrease in any way its contributions to school lunch or milk programs. All schools receiving payments under this article shall offer meals or milk to children in attendance thereat, without cost to any child unable to pay, and without distinction or segregation of any sort between paying or non-paying children. All payments made under this article shall be used only in extending the school lunch program, in providing free lunches and milk to needy children, in reducing the price of meals or milk to paying children or in improving the quality of such meals.

§ 579-d. Payment of amounts apportioned. The amount so apportioned shall be paid in the case of public schools in the same manner as other public school moneys are paid under article eighteen of the education law, and in the case of other than public schools at the same time as public school moneys are paid to public schools under article eighteen of the education law. The moneys so apportioned and paid shall be in addition to any moneys otherwise available for the same purpose. The commissioner of education may in his discretion withhold from a school district or from a school other than a public school, as the case may be, the whole or a portion of the sums to be apportioned as herein provided for a failure on the part of the school authorities thereof to

comply with such reasonable rules as he may prescribe.

§ 2. The sum of two million seven hundred fifty thousand dollars (\$2,750,000), or so much thereof as may be necessary, is hereby appropriated out of any moneys in the general fund in the state treasury to the credit of the local assistance fund not otherwise appropriated, for the purpose of contributing toward school lunches.

§ 3. The sum of fifteen thousand dollars (\$15,000), or so much thereof as may be necessary, is hereby appropriated out of any moneys in the general fund in the state treasury to the credit of the state purposes fund not otherwise appropriated, for administrative expenses including personal service, maintenance and operation and travel,

EXPLANATION — Matter in *italics* is new; matter in brackets [] is old law to omitted.

necessary to carry into effect the provisions of this act.

§ 4. The several sums hereby appropriated shall be paid on the audit and warrant of the comptroller, on vouchers certified or approved in the manner prescribed by law.

§ 5. If any clause, sentence, paragraph, section or part of this act be adjudged by any court of competent jurisdiction to be invalid, such judgment shall not affect, impair or invalidate the remainder thereof, but shall be confined in its operation to the clause, sentence, paragraph, section or part thereof directly involved in the controversy in which such judgment shall have been rendered.

§ 6. This act shall take effect July first, nineteen hundred forty-seven.

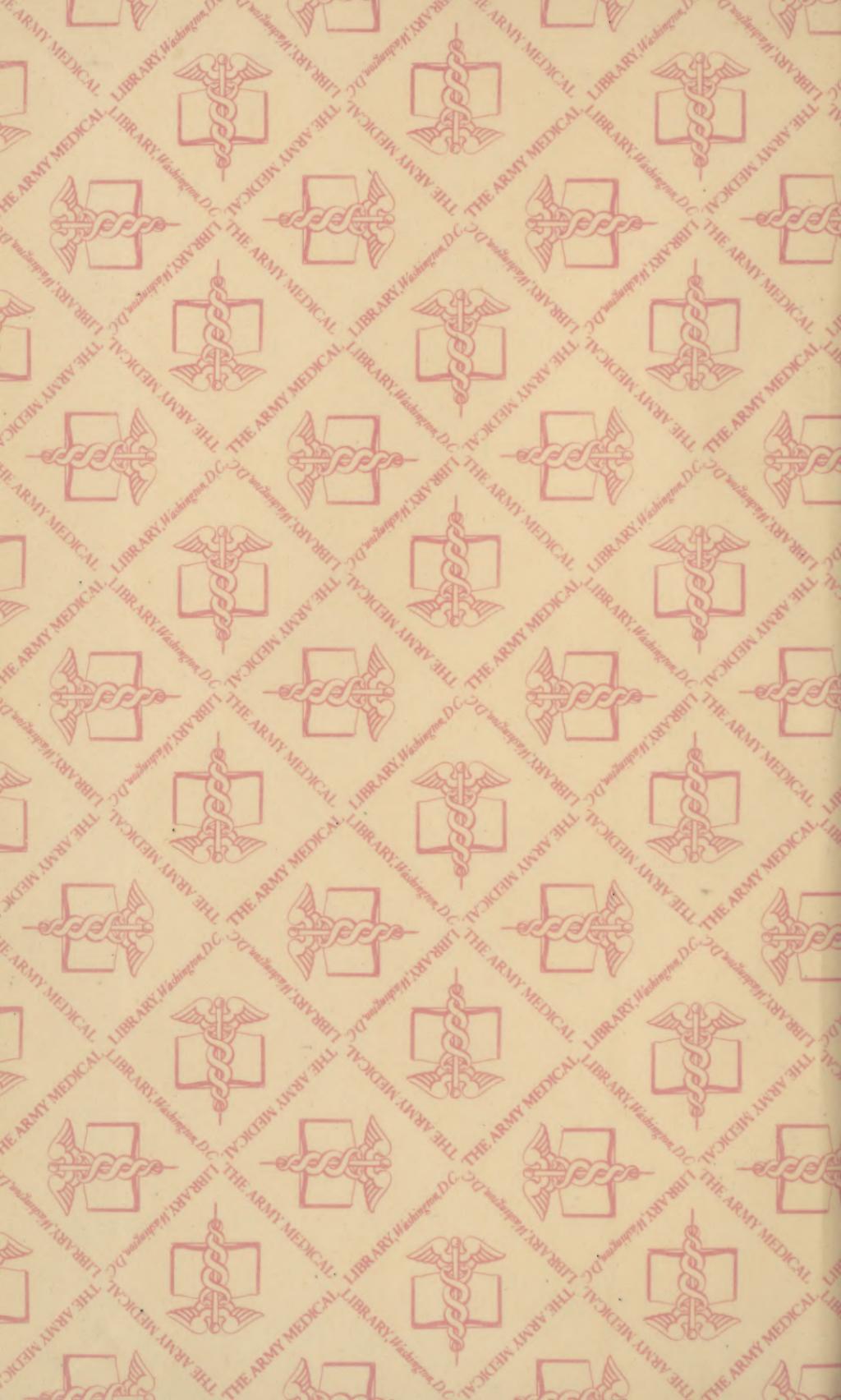
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